Investigations/Discovery Phase Report for the

Campanile Repairs & Restoration Project

for the

City of Springfield
Department of Capital Asset Construction

36 Court Street
Springfield MA 01103

City Contract No: 20180711
RFQ No. 17-054

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225 Friend Street, Suite 701
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Consultants
Vertical Access LLC
Silman
Buidling Conservation Associates, Inc.
Simpson Gumpertz & Heger, Inc.
AKF Group LLC
BLW Engineers, Inc.
Lerch Bates. Inc.
Verdin Bells & Clocks

Existing Conditions Investigation Reports

Funding for the Campanile Study was assisted by the people of Springfield through the Community Preservation Act.

November 8, 2019

Date: Circa 1915

Photo: Library of Congress Archives

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Date: October 18, 1910 *Photo: City of Springfield*

Introduction

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November 8, 2019

Mr. Peter Garvey, Director
Department of Capital Asset Construction
City of Springfield
36 Court Street
Springfield MA 01103

Re: **City Contract No. 20180711**
RFQ No. 17-054
Campanile Repairs & Restoration Project
BCA Project No. 18.016

Mr. Garvey:

Bruner/Cott Architects is pleased to submit our final report for the *Investigations and Discovery Phase* of the project which documents the team's findings from a comprehensive review and evaluation of the Campanile's condition. The team used a variety of investigative techniques as part of the evaluation and documentation process including:

- Photographic image collection (still and video) by UAV/drone flights for creation of a 3D photogrammetric model
- Exterior facade hands-on inspection and supplemental photography by industrial rope access
- Targeted in-situ exterior envelope inspection/probes
- In-place field measuring and verification for creation of a 3D BIM model
- Visual inspection of existing building systems, equipment and finishes
- Review of existing historical documentation and prior studies/reports
- Archival research for additional historical documentation

The 300-foot tall Campanile, as the centerpiece of the three-building City of Springfield Municipal Group designed by the New York City firm of Pell & Corbett in 1909, is a unique landmark structure facing the city's Court Square. As documented in this report, the Campanile has numerous deteriorated conditions or systems that are in critical need of replacement, repair and restoration, such as:

- The ashlar limestone facades are generally in poor condition with extensive cracking, displacement and spalling creating a safety hazard and the need for stabilizing netting at the corners.
- Elements of the structural steel frame exposed during the in-situ envelope inspections exhibit varying degrees of condition, from mild surface corrosion and deteriorated beam flanges to failed rivets and masonry kerf anchors.
- The terra cotta units replaced in the 1960's are generally in fair condition with significant cracking, glaze loss and spalling.
- The original Otis water hydraulic passenger elevator is not in service and has been decommissioned.
- The original Howard weight-driven, four-faced tower clock movement is not functional.
- The cast bell chime is not functional. The twelve bells are in good condition, although the support frame, strikers and controls are in poor condition.
- The mechanical, electrical and plumbing systems are in poor condition and beyond their service life. Fire protection systems (sprinklers and fire alarm) do not exist.

The Vertical Access Conditions Survey Report identifies several *Priority 1 Conditions* in the cupola's terra cotta which are a public safety concern.

The following individual consultant-prepared reports provide a detailed description of the conditions of their respective area of expertise as follows:

- Vertical Access LLC — Exterior inspection and documentation/archival research
- Silman — Structural engineering
- Building Conservations Associates, Inc. — Terra cotta
- Simpson Gumpertz & Heger, Inc. — Masonry and waterproofing
- AKF Group LLC — Building code analysis
- BLW Engineers, Inc. — MEP/FP engineering
- Lerch Bates. Inc. — Elevators
- Verdin Bells & Clocks — Tower clock and chimes
- Bruner/Cott Architects — Architecture

Today, the Campanile retains its striking presence on Court Square, despite the changing skyline around it. The Springfield Municipal Group remains a significant historic symbol of the city's government and its cultural strength which only reinforces the need to restore this landmark structure for the City of Springfield's continued enjoyment.

Should you have any questions, comments or need additional information, please feel free to contact me.

Sincerely,

Bruner/Cott Architects

Kenneth R. Guditz AIA
Senior Associate

Existing Conditions Investigation Reports

- **Exterior Envelope via Rope Access** *(Vertical Access LLC)*
  - Exterior Envelope Report Narrative - November 16, 2018
  - Annotated Drawings - November 16, 2018

- **Building Structure** *(Robert Silman Associates)*
  - Structural Code and Scope Feasibility Report - October 28, 2019
  - Existing Conditions Probe Assessment and Report - October 3, 2019

- **Terra Cotta Restoration** *(Building Conservation Associates)*
  - Terra Cotta Conditions Inspection and Findings - March 2019

- **Plaza Waterproofing and Masonry Restoration** *(Simpson Gumpertz & Heger)*
  - Elevated Plaza Paving and Waterproofing Investigation and Schematic Design - September 16, 2019
  - Limestone Cladding Investigation - September 23, 2019
  - Limestone Repair Options - October 28, 2019

- **Building Code and Thresholds** *(AKF Group LLC)*
  - Building Code and Thresholds Report - September 19, 2019

- **Mechanical, Electrical, Plumbing, and Fire Proofing** *(BLW Engineers)*
  - MEP/FP Existing Conditions Survey - September 19, 2019

- **Elevator** *(Lerch Bates)*
  - Elevator Modernization Survey - October 21, 2019
  - Preliminary Traction Elevator Power Data - October 10, 2019

- **Clock and Carrilon** *(Verdin Bells and Clocks)*
  - Chime and Tower Clock Proposal - January 4, 2019
  - Chime and Tower Clock Inspections and Findings - January 4, 2019
  - Fabrication of Bells and Automatic Bell Ringing Equipment - January 4, 2019
  - Design, Development, and Fabrication Agreement - January 4, 2019

- **Interior Architectural Finishes** *(Bruner/Cott Architects)*
  - Existing Architectural Finishes Conditions Memorandum - November 6, 2019

Date: September 30, 1910 *Photo: City of Springfield*

Exterior Envelope Inspection

Vertical Access LLC

P.O. Box 4135
Ithaca, NY 14852

Project Team:

Kelly Streeter PE
Kristin Olson
Patrick Capruso
Kevin Dalton
Michael Patino
Mike Russell

- Exterior Envelope Report Narrative
- Annotated Drawings
- Condition Photography, Survey Conditions Drawings and Surveys, and TPAS User Manual are included in Report Appendix.

Report Narrative

VERTICAL access

Springfield Campanile

Vertical Access LLC
PO Box 4135, Ithaca, NY 14852
Tel: 607 257 4049 / Fax: 607 257 2129

Vertical Access LLC (VA) was retained by Bruner/Cott Architects to perform an exterior investigation of the Springfield Campanile in Springfield, MA to assist the design team in the discovery process in advance of the development of repair recommendations.

VA technicians Kristen Olson and Kevin Dalton were on site September 4-6, 2018 to gather initial imagery with a UAV (drone) for the preparation of photogrammetric background drawings. Kelly Streeter and Mike Russell gathered additional UAV imagery on October 8, 2018. Patrick Capruso, Kristen Olson, Michael Patino, Kevin Dalton and Kelly Streeter were on site October 23-26, 2018 to undertake hands-on and visual inspection of the Campanile exterior with a combination of investigative techniques.

The Campanile is in poor condition. Overall the limestone ashlar units are in variable condition with extensive cracks through units and joints at the corners. Significant horizontal displacement was observed at many of these cracks. Frequent spalls were observed, typically adjacent to these crack systems. The terra cotta ashlar and ornamental units at the cupola are in fair to poor condition with significant glaze loss, cracking, spalling, and extensive rust soiling.

This *Report Narrative* with photographs, annotated AutoCAD drawings and extracted condition quantities constitute VA's *Condition Survey Report* of the Springfield Campanile. A user's manual for VA's Tablet PC Annotation System (TPAS®) is also included. A digital copy of the *Condition Survey Report* is provided on a USB drive.

Description of Deliverables

Report Narrative

This *Report Narrative* includes a description of the project deliverables, the scope of work and this narrative summarizing the conditions noted during the inspection. Conditions documented by Vertical Access and described in the *Report Narrative*

use terminology consistent with VA's Conditions Glossary (http://www.vertical-access.com/glossary.html). Supporting photographs illustrating representative and notable conditions are cited in the *Report Narrative*. The last section of the *Report Narrative* includes conclusions and preliminary interpretations of the survey findings.

Guide to TPAS Annotated Drawings

A *Guide to TPAS Annotated Drawings* follows the *Report Narrative*. While printed photographs and drawings are presented as part of this report, the most efficient way to analyze the survey data is by using the features available in the digital drawing files. Readers are encouraged to refer to the *Guide to TPAS Annotated Drawings* before using the report to develop recommendations.

TPAS utilizes a library of previously drawn material condition symbols or attribute tags to annotate digital survey drawings in the field. The severity and amount of each condition are recorded within the annotations.

The *Guide* describes key TPAS features:

- Enabling hyperlinks and opening digital photographs directly from the AutoCAD drawing
- Viewing and editing survey data embedded within condition annotations
- Creating views within AutoCAD or within the PDF drawing to visually display information about specific conditions, by turning layers on and off
- Extracting numerical survey information contained in the AutoCAD drawing for export into a spreadsheet or database

Photographs

The *Photographs* section of the report includes images of representative and notable conditions taken during the survey. Each photograph is hyperlinked to a condition code within the AutoCAD drawing so that it can be viewed easily as a digital file. Each photograph has a three-part name including the Cartesian (x-y) coordinates corresponding to the condition's location within the AutoCAD drawing, the type of material and condition documented, and the year in which the photograph was taken. The Cartesian grid used to name the photographs is shown on the drawings. For reference, the table below lists the x-coordinates of the elevation views:

X Coordinate	Y Coordinate	Elevation View	Sheet No. & Drawing No.
10 to 50	20 to 190	Southeast – Limestone Base to Observation Level	Sheet 1, Drawing 1
90 to 130	20 to 190	Northeast – Limestone Base to Observation Level	Sheet 1, Drawing 2
170 to 210	20 to 190	Northwest – Limestone Base to Observation Level	Sheet 1, Drawing 3
250 to 290	20 to 190	Southwest – Limestone Base to Observation Level	Sheet 1, Drawing 4
10 to 50	190 to 300	Southeast – Terra Cotta Cupola	Sheet 2, Drawing 1
90 to 130	190 to 300	Northeast – Terra Cotta Cupola	Sheet 2, Drawing 2
170 to 210	190 to 300	Northwest – Terra Cotta Cupola	Sheet 2, Drawing 3
250 to 290	190 to 300	Southwest – Terra Cotta Cupola	Sheet 2, Drawing 4

Annotated Drawings

Full-size 24" by 36" drawings and reduced-scale 11" by 17" drawings are provided in the *Annotated Drawings* section. The drawings document the condition of the Campanile. VA created photogrammetric backgrounds and inserted the images into a single AutoCAD drawing with each elevation view placed to have a unique set of x-y coordinates.

Spreadsheet of Survey Conditions

A *Spreadsheet of Extracted Survey Conditions* is included with this report. The spreadsheet contains three sheets:

- A Data Key shows the layer, condition, code, and unit of measurement for the quantities and severity of each condition;
- The Condition Totals provides overall counts and quantities for each type of condition;

- And the Extracted Survey Conditions sheet catalogs each individual condition identified during the survey, including location, photograph, quantity and severity data extracted from the annotated AutoCAD drawings.

Appendix - Archival Research

A written Developmental History report, bibliography, and selected source documents are included as an appendix to VA's Condition Survey Report.

3D model within Pix4Dmapper software

3D Model

As part of VA's scope of work for the investigation of the Springfield Campanile, a 3D photogrammetric model was created using imagery captured by VA's Unmanned Aerial Vehicle (UAV). From the 3D model created in Pix4DMapper software, VA generated 2D orthomosaics for each façade elevation for use as AutoCAD drawing backgrounds. Files exported from the 3D model, and included as digital deliverables with this report, include the point cloud in .las format and 3D mesh files in .fbx, .mtl, and .obj formats with textures in .jpg format. The 3D model in .p4d format and source photographs in .jpg format are also included with the 3D model files.

USB Drive

All of the documents composing this *Condition Survey Report* are provided in digital format on a USB drive. Digital files include a full *Condition Survey Report* in PDF format, the Report Narrative in PDF format, JPG image files of survey photographs, survey video in MP4 format, annotated elevation drawings in AutoCAD DWG and PDF formats, spreadsheet quantities in Microsoft Excel XLS and PDF formats, 3D model files, and archival research appendices.

Web Portal

The cloud-hosted report available on a TPAS web portal allows users to organize and perform key-word-searches for conditions and to easily see photographs of each condition, thumbnails of annotated drawings highlighting the location of specific conditions and total quantities for each condition type. The web portal is available via any internet browser at http://code.tpasllc.com/brunercott.

The evaluations and recommendations in this report and its exhibits regarding the condition of building materials and the potential effect on the safety of persons and property are made in the opinion of the VA technical personnel who observed the materials on site and are based on their judgment, knowledge, and prior experience of similar conditions; however, VA makes no warranty or guarantee regarding the accuracy of these evaluations and recommendations.

Scope of Work

A combination of investigative techniques was utilized in the investigation of the Springfield Campanile. Inspection of the exterior façades was accomplished primarily through industrial rope access. Conditions at the uppermost terra cotta documented using high-resolution video from a GoPro camera mounted on a 25' extendable pole and from an Unmanned Aerial Vehicle (UAV or drone). Conditions observed in the GoPro and UAV video were annotated on the drawings using TPAS, with notes linked to still images taken from the video. Areas closest to grade were inspected visually from the ground.

VA's UAV was utilized to capture digital photographs and video of the Campanile elevations. Two types of drone flights were conducted: still photographs to be used in the construction of a photogrammetric model were taken at a distance of approximately 40' to 60' from the façades, while high definition video was taken for condition inspection at a distance of between 20' and 25' from the façades. As part

of VA's scope, the photogrammetric model was used to create the background images for the condition survey annotated drawings.

VA drone pilots are licensed by the FAA and operate in compliance with 14 CFR Part 107 regulations governing the commercial use of small unmanned aerial vehicles. At the time of the investigation, the Springfield Campanile was located in Class G, unrestricted airspace.

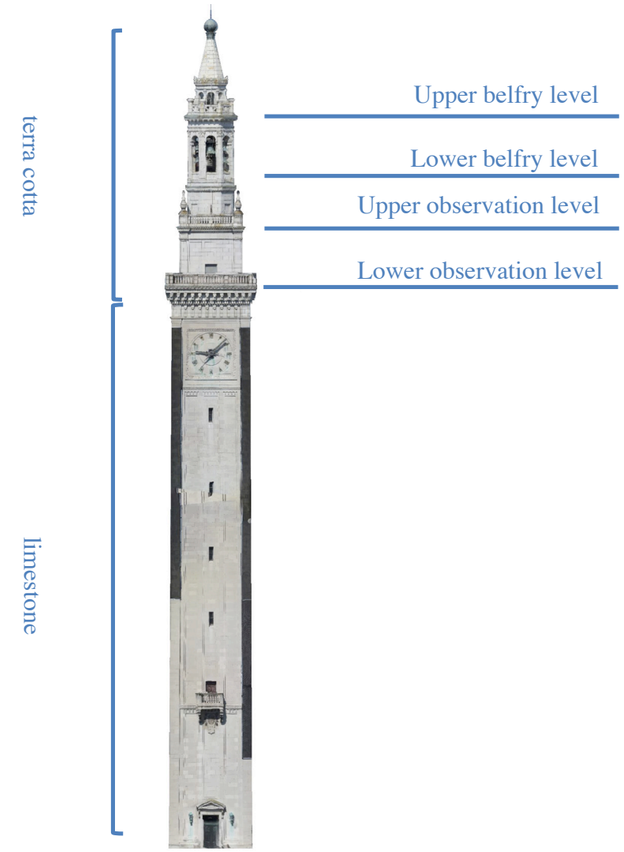
Industrial rope access was used to investigate the facades of the limestone tower shaft and terra cotta cupola below the upper belfry level. In general terms, technicians are suspended on one rope termed the "work positioning line" with a redundant "fall protection line" used as backup. Hands-off descent control and fall protection devices are integrated into site-specific rigging systems, along with industry-specific climbing and suspension harnesses. Vertical Access technicians are third-party certified for industrial rope access work by SPRAT, the Society of Professional Rope Access Technicians.

Building Description

The Springfield Campanile is one of three connected Neoclassical structures, designed and built concurrently, which comprise the City of Springfield Municipal Group. The buildings were designed by the firm Pell & Corbett of New York City, based upon their winning design competition entry. Construction began in 1909 and the Municipal Group was dedicated in December 1913.

The Campanile is square in plan and rises approximately 300' from a raised terrace connecting it to City Hall to the northeast and Symphony Hall to the southwest. The steel frame from grade to just below the lower observation level is clad in Indiana limestone with brick back-up. The steel structure above is clad in terra cotta with brick back-up, and topped with a sheet metal ball-and-rod finial. The two observation levels have terra cotta balustrades; above them is an open lower belfry level containing 12 bells. An upper belfry level is the topmost accessible level. The principal façade of the Campanile faces southeast to Court Square and features a small balcony at an elevation of approximately 50 feet above the raised terrace. Clock faces on all four facades of the tower have ornate bronze clock hands and bronze numerals backlit by round windows. Doors with cast bronze bas-relief panels lead into the Campanile from the raised terrace at the southeast, northeast, and southwest facades.

At the interior, a winding stair provides access from the basement level at grade to the upper observation level, while the belfry levels are accessed via ladders. A single elevator car historically provided access between the basement level and the lower observation level, but is not currently operational. Narrow windows are located at stair landings on the southeast and northwest facades, while the northeast and southwest facades each have a single window above the terrace-level entrances.



Approximately 25' was added to the overall height of the Campanile during construction.[1] Other major alterations include the removal of a spiral stair at the belfry levels, rebuilding of the terra cotta including minor alterations to decorative details in the 1960s, and the relatively recent installation of debris netting at all four corners of the limestone shaft where there is significant cracking and displacement.

The Springfield Municipal Group is listed on the National Register of Historic Places as part of the Court Square Historic District and it has been documented by the Historic American Buildings Survey. More information about the construction history can be found in Appendix – Archival Research.

[1] Harvey Wiley Corbett, "Comment on Competitions and the Results of One," *Architecture*, Vol. 29, No. 6, June 1914.

Findings

Conditions of deterioration such as cracks, spalls, displacement and failed repairs in the exterior limestone and terra cotta masonry were documented by VA technicians. The location and quantities of conditions were documented using TPAS. Each TPAS annotation includes a description of the condition, numerical values for the amount or severity of the condition and an assigned priority level. The priority level is a rating of public safety concern. Vertical Access identified several Priority 1 conditions during the investigation. For ease of reference, an additional spreadsheet, drawing layouts, and photo layout showing only Priority 1 conditions are included with this report. Priority 2 conditions are not imminently hazardous but should be repaired as part of a comprehensive restoration. These conditions include missing and incipient spalls, cracks, surface loss, and failed mortar and sealants. All other conditions are NA (not applicable) or Priority 3, indicating an observation that does not have an immediate safety or waterproofing implication, or that is mainly aesthetic in nature, such as soiling.

Terra Cotta

The terra cotta cupola is in fair to poor condition with extensive glaze loss, cracking, and bonded and incipient spalls observed. Significant displacement is limited to the octagonal roof and columns. The caulked mortar joints were observed to have universally failed. Areas of rust staining were observed around the base of the cupola at the facet corners. The lead-coated copper flashing that covers the cornice at the base of the octagonal roof appears to be in good condition, but the sealant joint where the top of the flashing meets the terra cotta above has failed.

Priority 1 Conditions

Photograph 113-271: A bonded terra cotta spall designated as a Priority 1 condition.

- Three hazardous incipient spalls, labeled “Haz” on the annotated drawings, were documented at the terra cotta ridge units between the facets of the octagonal roof crowning the cupola. Two of the hazardous spalls were observed above the northwest elevation. These spalls measure approximately 20 square inches (see photographs 188-271 and 191-274). The third hazardous spall was documented at the southwest elevation and measures roughly 15 square inches (see photograph 268-274).
- An ashlar unit located beneath the ornate parapet at the upper belfry on the northeast façade exhibited substantial spalling. Documented as a bonded spall, labeled “B” on the annotated drawings, the area of loose, potentially hazardous material measures approximately 600 square inches (see photograph 115-258).
- A single unit crack, labeled “C” on the annotated drawings, with a width of approximately 1/8 of an inch was documented running through the large urn at the south corner of the upper observation level on the northwest façade (see photographs 198-232).
- A crack system through units and joints (“CUJ”) was observed running roughly 8 feet up the southernmost facet of the octagonal roof above the northwest façade (see photograph 192-274). The crack width was estimated

to measure nearly 1 inch.

- Two cracks through single mutules were noted under the cornice above the upper observation level. The widths of both cracks measure less than a 1/16 of an inch but the conditions were deemed Priority 1 due to their location above the observation level (see photographs 189-257 and 269-256).

Priority 2 Conditions

- Cracks through single units ("C") are differentiated from system cracks that extend through mortar joints ("CJ"), units ("CU"), or units and joints ("CUJ"). Cracks documented in the terra cotta are typically 1/16 of an inch wide or less (see photographs 36-264, 110-227, and 186-233). Thicker cracks were common at the large urns on the upper observation level and through units and joints at the octagonal roof (see photographs 22-226 and 29-275 respectively).
- Cracks through individual baluster units were typical at the terra cotta balustrade that wraps around the perimeter of the upper observation level (see photographs 25-226).
- Hairline crazing ("Crz") in the terra cotta glaze was common; representative areas were documented (see photographs 30-237 and 193-236).
- Missing spalls, labeled "M" on the annotated drawings, are locations where spalled material was missing at the time of the investigation. Spalls that have not completely formed yet, resulting in incipient spalls, are labeled "I." Where incipient or loose spalls were removed during the investigation, the drawings are labeled "R" for "removed." Finally, spalls that are fully-formed but held firmly in place, typically by sealant, are labeled "B" for "bonded." The majority of spalls documented at the cupola measure 20 square inches or less (see photographs 118-226 and 265-223).
- Instances of horizontal ("Hor") and horizontal and vertical ("HV") displacement were common in units at the octagonal roof and at the belfry columns. Displacement at the columns measured up to 1/4 of an inch (see photograph 34-244). Displacement at the roof facets was estimated to measure up to 1 inch (see photographs 33-275).
- Caulked mortar failure ("MorClkF") was universal at the cupola where the sealant that has been applied over mortar joints in the terra cotta masonry exhibited cracking, separation, total loss or other signs of deterioration (see photographs 18-253, 31-219, and 190-251).
- A number of failed patches ("PF") were documented where a previous repair to a terra cotta unit, typically made with cementitious material, was cracked, separated, loose, or otherwise deteriorated. The largest failed patch repair

measured approximately 20 square inches (see photograph 114-256).

- Chipped units ("Chp") exhibiting a shallow loss of material were common along with widespread instances of glaze loss revealing the porous bisque beneath the glaze (see photographs 184-230 and 199-226 respectively).

Priority 3 Conditions

- Orange brown, iron-based rust staining ("Rst") was typical and easily identified on the white satin glaze at the terra cotta cupola units (see photographs 30-238 and 188-246). The rust stain suggest deterioration at the steel anchors and substrate supporting the terra cotta cladding. Additionally, the occurrence of leached salts ("Lch"), hard encrustations or deposits of salts on the surface of the terra cotta units, suggests that moisture is prevalent at the brick back-up masonry (see photographs 179-225 and 185-205). Instances of copper staining ("Cpr") and the presence of biological soiling ("Bio") were also documented at the cupola (see photographs 267-268 and 37-255 respectively).

Exterior Limestone Masonry

The limestone ashlar and ornamental masonry is in variable condition. The ashlar units are in fair condition with frequent spalls and hairline crack systems. The corners are in poor condition with extensive crack systems through units and joints, many associated with horizontal displacement.

Priority 1 Conditions

Photograph 269-130: A Priority 1, hazardous stone spall.

- Horizontal displacement ("Hor") of roughly four limestone units was observed beneath the clock face at the south corner of the southeast façade. This displacement was estimated to measure 3/8 of an inch (see photograph 18-162). The horizontal displacement of approximately twenty units was also documented beneath the clock face at the north corner of the same façade. In this instance, displacement of up to 1 inch was observed (see photographs 42-165).
- A crack system through units and joints ("CUJ") with a width of 1/16 of an inch was noted at the bottom of the east corner on the southeast façade. The crack system runs roughly 28 feet up the façade (see photographs 41-42).
- A series of significant crack systems run the height of the east and west corners of the northeast façade. Crack widths typically measured 1 inch. These crack systems were observed through the existing netting that was left in place during the investigation.

- Two crack systems through units and joints with a width of approximately 1/8 of an inch were observed running east to west through limestone units at the center of the northeast façade (see photographs 103-127 and 103-129). An associated failed cementitious patch repair measuring 15 square inches was also documented (see photograph 107-128).
- Horizontal displacement of up to 1/4 of an inch was observed at the bottom of both corners on the northeast façade.
- Horizontal displacement measuring approximately 2 inches at the most severe instances was documented at the top half of the north corner on the northwest façade along with associated failed previous crack repairs ("CRprF") (see representative photographs 177-150 and 178-152). Crack systems through units and joints with a width measuring 1 inch were observed at the opposite corner (see photographs 201-160 and 202-148).
- A crack system through units and joints ("CUJ") with a length of approximately 10 feet and a width of 1/4 of an inch was noted above the center of the west corner of the southwest façade (see photographs 284-147). At the same corner, just below center, a crack system through joints ("CJ") was observed running roughly 37 feet down a return (see photographs 281-92).
- Vertical Access documented five potentially hazardous spalls at the limestone masonry. An incipient spall ("I") measuring roughly 40 square inches was documented in an ashlar unit framing the clock face on the southeast façade (see photograph 38-190). A bonded spall ("B") measuring an estimated 75 square inches was documented just outside of the debris netting at a recessed ashlar unit near the top, north corner of the clock face (see photograph 39-186). An entire corner unit was missing beneath the debris netting at the center of the south corner on the northwest façade. This condition was deemed potentially hazardous ("Haz") as it may affect surrounding masonry (see photographs 202-124 and 256-128). Missing limestone material at two units near the east corner of the southwest façade has resulted in two potentially hazardous bonded spalls (see photographs 261-109).
- An entire course of limestone masonry at the center of the southwest façade exhibits missing, bonded, and incipient spalling (see photographs 269-130). Associated horizontal displacement of 1/4 of an inch was also annotated. Just above the displaced course of limestone, additional horizontal displacement of 3/8 of an inch was documented along with associated spalling and surface loss (see photographs 260-135).

Priority 2 Conditions

- Missing, incipient, bonded, and removed spalls at the exterior limestone masonry was widespread and common. The majority of spalls documented by Vertical Access measure 20 square inches or less (see photographs 24-125, 199-124, and 274-184).
- As the annotated drawings illustrate, a number of concentrated areas of spalling were observed. Spalling was prevalent at the center of the northeast façade in close proximity to the Priority 1 horizontal crack systems (see photographs 109-128 and 111-129). Similar conditions were apparent at the center of the southwest façade. Additional areas of concentrated spalling at the southwest façade are located adjacent to the third-floor window near the pediment above the entrance. Several missing spalls measuring between 80 and 100 square inches were noted beneath the debris netting at the wash course on the northeast façade.
- Cracks through single units, vertical and horizontal crack systems, and failed previous crack repairs at the ashlar units were documented intermittently. The majority of Priority 2 cracks through the limestone masonry have a width ranging from hairline to 1/4 of an inch (see photographs 18-93, 117-178, and 42-172).
- Overall, the mortar at the limestone masonry is in fair to good condition with instances of failed ("MorF") or missing ("MorM") limited to a few isolated locations. Mortar failure at the limestone balcony on the southeast façade was universal (see photographs 26-69 and 27-66).
- VA technicians observed a limited number of failed cementitious repairs ("PF") at the limestone masonry. Failed patch repairs typically measured less than 40 square inches. Failed Dutchman repairs were apparent at the base of the Campanile, resulting from failure of the mortar or sealant bonding the Dutchmen to the surrounding masonry (see photographs 102-33 and 35-23).
- Chipped ("Chp") and eroded ("Erd") units were observed intermittently at the limestone masonry. Surface loss typically measured between 1/8 and 1/4 of an inch (see photographs 185-148 and 197-131).

Priority 3 Conditions

- Representative instances of atmospheric soiling ("Atm") from airborne pollutants was documented at the limestone pediment above the northeast entrance and at the cartouche beneath the balcony on the southeast façade (see photographs (109-37 and 28-61).
- The presence of black crusts ("Blck"), the accumulation of insoluble gypsum formed by the reaction of particulate pollutants with the limestone and

darkened by atmospheric soiling, was documented at the base of the Campanile near the northeast and southwest entrances (see photographs 106-22 and 265-21).
- Greenish copper-based stains ("Cpr") typically appeared in streaks below the architectural metal elements at the clock face and lighting fixtures located at the base (see photographs 271-178 and 264-24).
- The presence of efflorescence ("Eff"), the white, soft deposition on the surface of masonry due to evaporative precipitation of salts, was documented beneath the balcony on the southeast façade (see photographs 28-63).
- Biological soiling ("Bio"), including nesting, was documented at the pediments above the southeast and northeast entrances (see photographs 27-35 and 28-32) and a representative instance of guano soiling ("Gua) was documented at a window sill on the southeast façade (see photographs 30-91).

Architectural Metals

The clock faces and hands, the bells, bell supports, ornamental doors and lamps comprise the architectural metals at the Campanile. Overall the architectural metals are in fair condition.

Priority 1 Condition

- A loose ("L") and potentially hazardous clock numeral I was documented at the northeast façade (see photograph 114-185). The numeral has shifted approximately one inch from the surface of the stone clock face.

Priority 2 Conditions

- Two additional loose clock numerals were documented at the northeast elevation (see photographs 106-186 and 109-186). These numerals have shifted approximately one half inch from the surface of the stone clock face.
- A loose steel angle installed to anchor the debris netting was observed at a pilaster return adjacent to the clock face on the northeast façade (see photograph 119-173). The angle is installed with a single bolt, and it is not flush against the netting and stone.
- Instances of surface corrosion ("Srf") were documented at the steel beams that support the bells at the terra cotta arches in the belfry (see photograph 110-249).
- Bent ("Bnt") and perforated ("Prf") metal mesh screens on the inboard side

of the balustrade at the observation level were noted (see photograph 42-207). Additionally, perforated metal was documented at the tip of the minute hand on at the southeast clock (see photograph 28-177).

Sheet Metals

Overall, the sheet metal flashing at the Campanile is in fair condition with only two instances of torn ("Trn") material documented (see photographs 44-204 and 98-203). Failed soldered seams ("SldF") where the soldering between sheet metal elements exhibited tearing, separation, and other signs of deterioration were typical at the flashing above the cornices of both observation levels (see photographs 191-222 and 196-203).

Glass

Priority 1 Condition

- A loose and potentially hazardous piece of glass was observed at the round window contained within the numeral I metal frame on the southeast façade (see photographs 33-186).

Priority 2 Conditions

- Several missing ("M") pieces of glass were documented within the clock numerals (see photograph 27-186). Additionally, a number of cracks ("C") were observed in the glass at other numerals (see photograph 25-178).

Wood

Overall, the wooden window surrounds are in poor to fair condition with failed paint coating ("CtF") and rot ("Rot") documented throughout (see photographs 30-140 and 190-84).

Measurements

VA took several measurements to spot check the scale of the 3D model and to confirm that the limestone portion of the Campanile tapers as it rises from the terrace level to the observation level cornice.

- Rough plumb bob measurements utilizing rope access technicians' weighted drop ropes as a plumb line shows the overall width of the limestone façades decrease by roughly 1'-6" from the base of the tower to just below the terra cotta cornice above the clock faces. See notes on Sheet 1 of the Annotated Drawings.
- Measurements taken of the 3D model utilizing measurement tools in the Pix4Dmapper software confirm that the overall width of the limestone facades decreases from approximately 28'-5" at the base to approximately 26'-3" just below the terra cotta cornice above the clock faces.
- Measurements taken of the 3D model utilizing measurement tools in the Pix4Dmapper software confirm that approximately 25' was added to the overall height of the tower as previously noted, when compared to dimensions noted on Pell and Corbett's drawings of the steel structure dated Nov. 24, 1909.

Conclusions and Preliminary Interpretations

Vertical Access utilized a combination of techniques in the investigation of the Springfield Campanile. Industrial rope access served as the primary access method during the course of the survey work at the exterior façades while conditions at the uppermost terra cotta were documented using high-resolution video from a GoPro camera mounted on a 25' extendable pole and from an Unmanned Aerial Vehicle.

Overall, the Campanile is in poor condition. The limestone ashlar units are in variable condition with extensive cracks through units and joints at the corners. Significant horizontal displacement was observed at many of these cracks. Frequent spalls were observed, typically adjacent to these crack systems. The terra cotta ashlar and ornamental units at the cupola are in fair to poor condition with significant glaze loss, cracking, spalling, and extensive rust soiling.

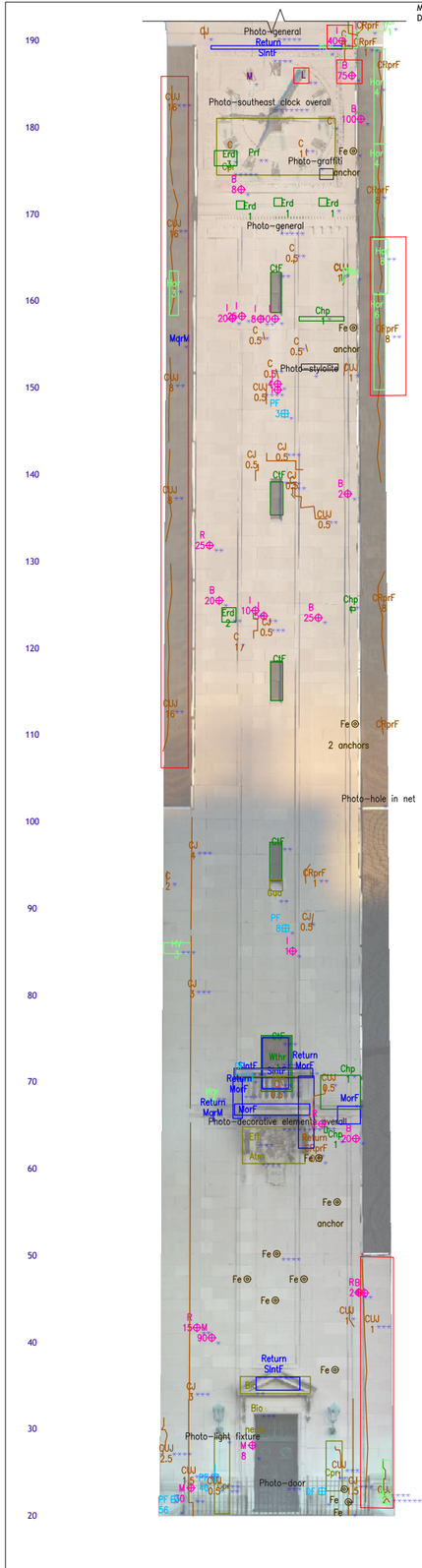
Vertical Access remains available and on call to the project team to discuss our findings and to demonstrate the functionality and utility of TPAS and the web portal for evaluating the conditions of the Springfield Campanile.

Respectfully submitted for Vertical Access LLC by:

Kelly Streeter, Kristen Olson, and Patrick Capruso

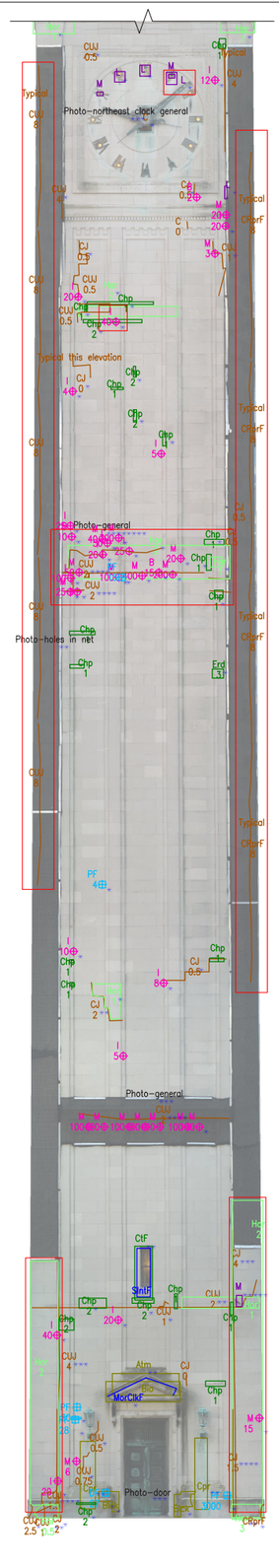
November 16, 2018

Match line: Drawing 2.1



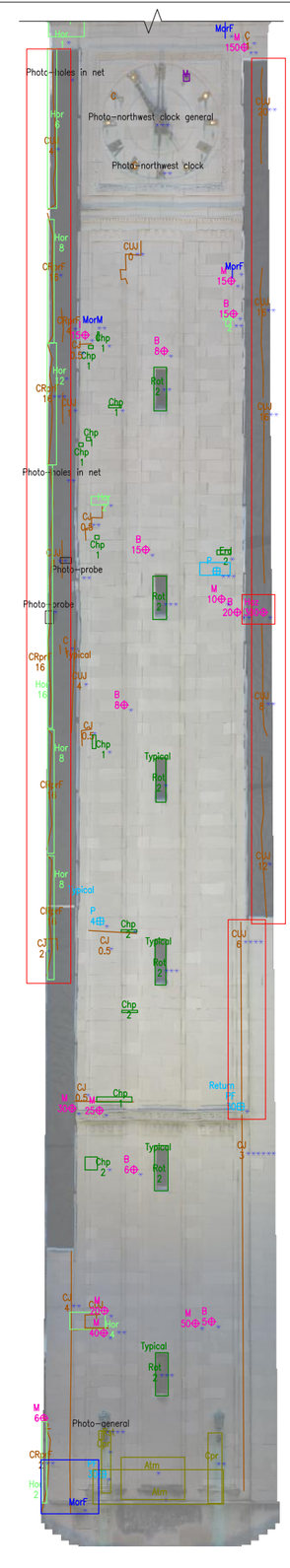
1.1 Southeast

Match line: Drawing 2.2



1.2 Northeast

Match line: Drawing 2.3



1.3 Northwest

Match line: Drawing 2.4

1.4 Southwest

KEY TO SYMBOLS

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--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
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--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.
Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

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This box symbol indicates an area of biological soiling, which was not photographed: Bio

This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: CJ 3

This box symbol indicates a Priority 1 condition:

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C	Crack	Width in 1/16" increments:	Length in lin.ft.
		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32 inch	
		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	Number of units
		HV	Horiz. & Vert. disp.	1 0 to 1/8 inch	
				2 1/8 to 1/4 inch	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk	Mortar Caulked	Not Applicable	Length in lin. ft.
		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed	Size of repair in square inches	Not applicable
		D	Dutchman sound		
		PF	Patch Failed		
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric	Not applicable	Area in sq. ft.
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper		
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls		B	Bonded	Size of spall in square inches	Not applicable
		Haz	Hazardous		
		I	Incipient		
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss in 1/8" increments:	Area in sq. ft.
		Erd	Eroded	1 0 to 1/8 inch	
		Glz	Glaze loss	2 1/8 to 1/4 inch	
Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

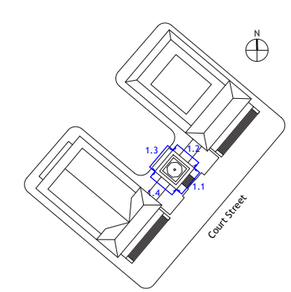
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan

SURVEYED USING tpas
SURVEY DATE: October 23-26 BY: PC, KDs, KO, MP, KS
VERTICAL access
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

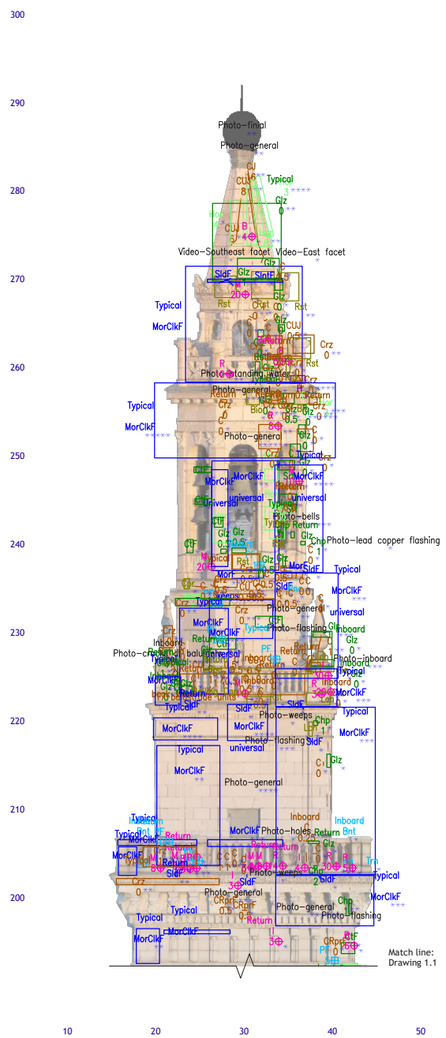
ELEVATIONS
LIMESTONE TOWER SHAFT

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

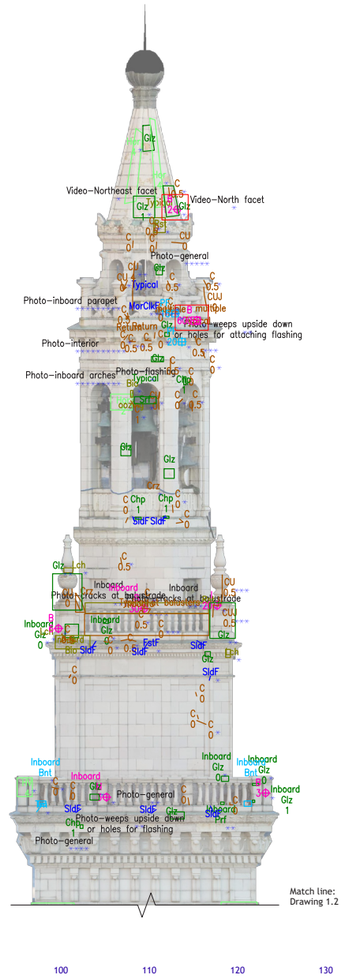
Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

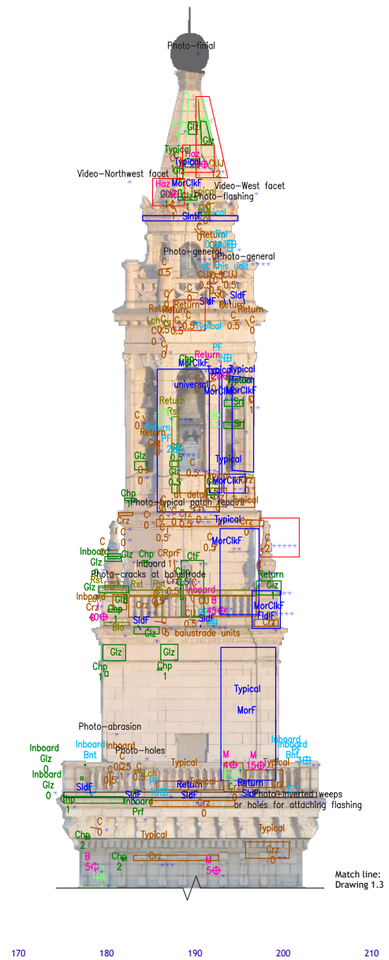
1



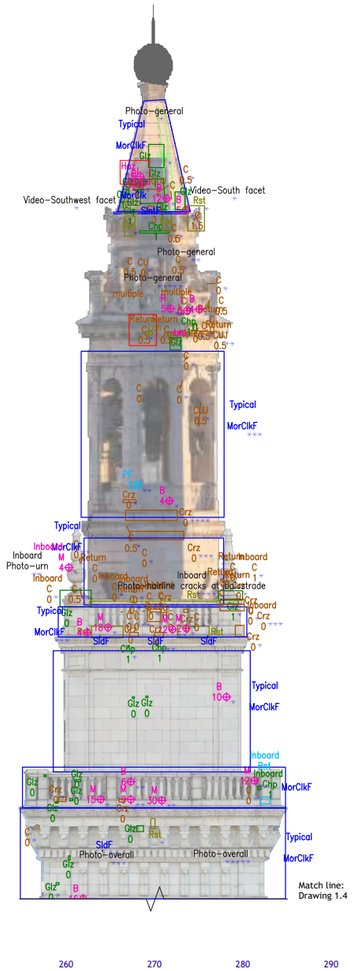
2.1 Southeast



2.2 Northeast



2.3 Northwest



2.4 Southwest

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KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C	Crack	Width in 1/16" increments:	Length in lin.ft.
		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32 inch	
		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	Number of units
		HV	Hortz. & Vert. disp.	1 0 to 1/8 inch	
				2 1/8 to 1/4 inch	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk	Mortar Caulked	Not Applicable	Length in lin. ft.
		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed	Size of repair in square inches	Not applicable
		D	Dutchman sound		
		PF	Patch Failed		
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric	Not applicable	Area in sq. ft.
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper		
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls		B	Bonded	Size of spall in square inches	Not applicable
		Haz	Hazardous		
		I	Incipient		
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss in 1/8" increments:	Area in sq. ft.
		Erd	Eroded	1 0 to 1/8 inch	
		Glz	Glaze loss	2 1/8 to 1/4 inch	
Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

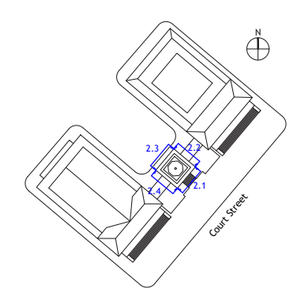
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan

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VERTICAL access
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607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

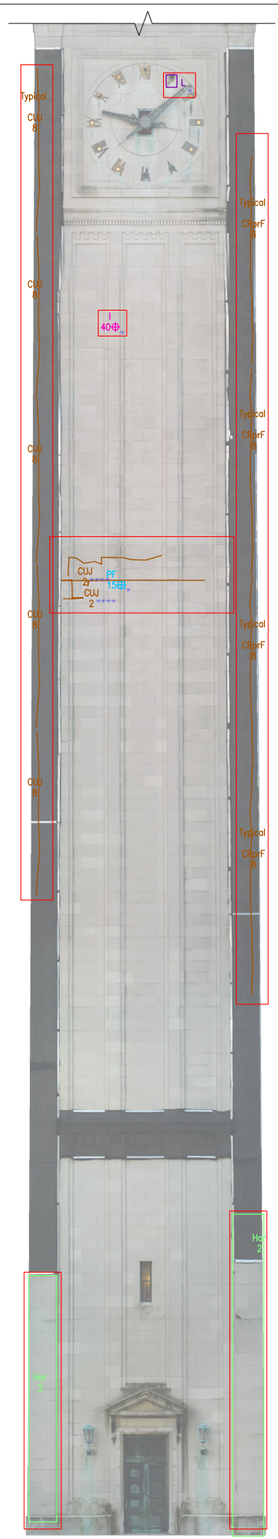
ELEVATIONS
TERRA COTTA BELFRY & OBSERVATION LEVELS

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

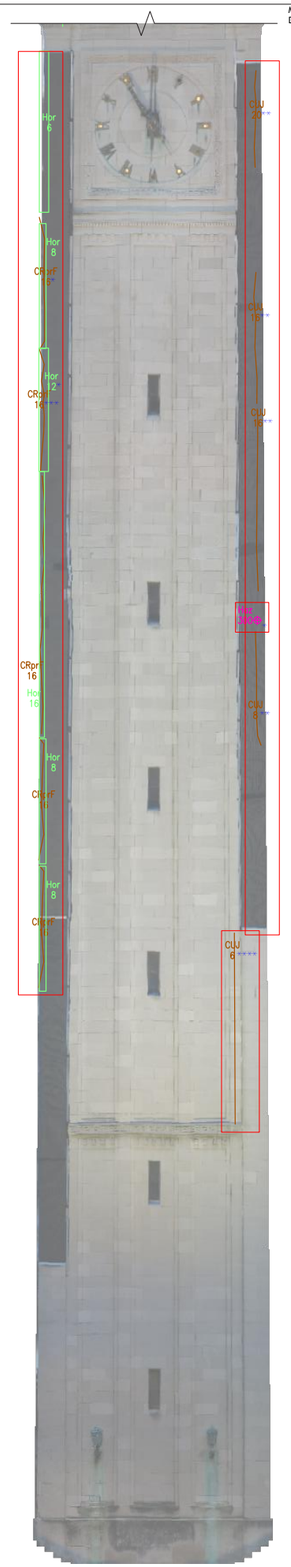
Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

3.1 Southeast



3.2 Northeast



3.3 Northwest

3.4 Southwest

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This box symbol indicates a Priority 1 condition:

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C	Crack	Width in 1/16" increments:	
		CJ	Crack system: Joints	0 Hairline	
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		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	
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		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed		
		D	Dutchman sound	Size of repair	
		PF	Patch Failed	in square inches	Not applicable
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric		
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper	Not applicable	Area in sq. ft.
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls	⊠	B	Bonded		
		Haz	Hazardous	Size of spall	
		I	Incipient	in square inches	Not applicable
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss	
		Erd	Eroded	in 1/8" increments:	Area in sq. ft.
		Glz	Glaze loss	1 0 to 1/8 inch	
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Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

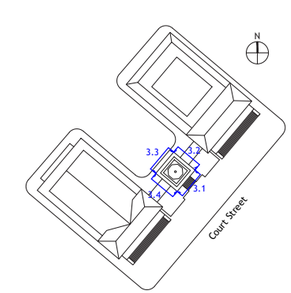
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

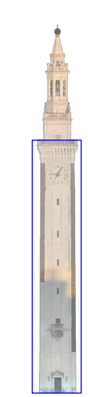
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan



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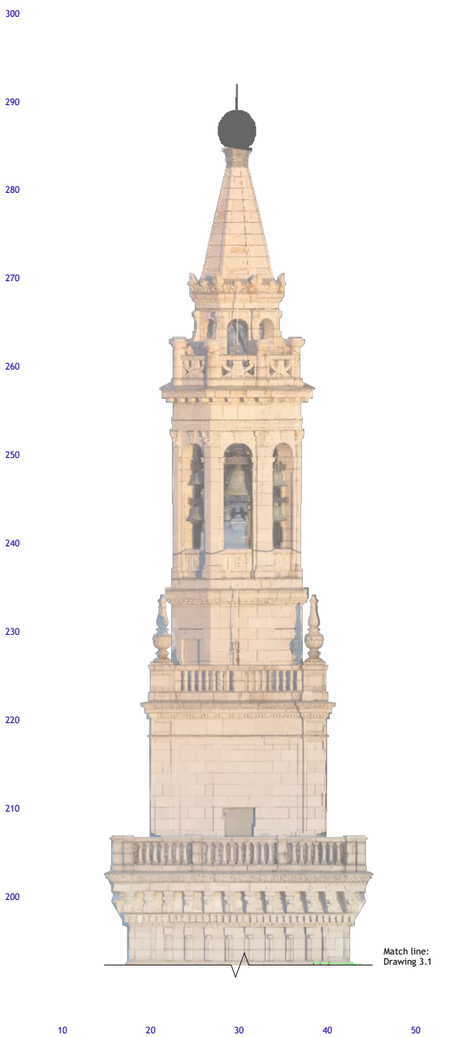
VERTICAL access
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

ELEVATIONS
LIMESTONE TOWER SHAFT - PRIORITY 1 CONDITIONS

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

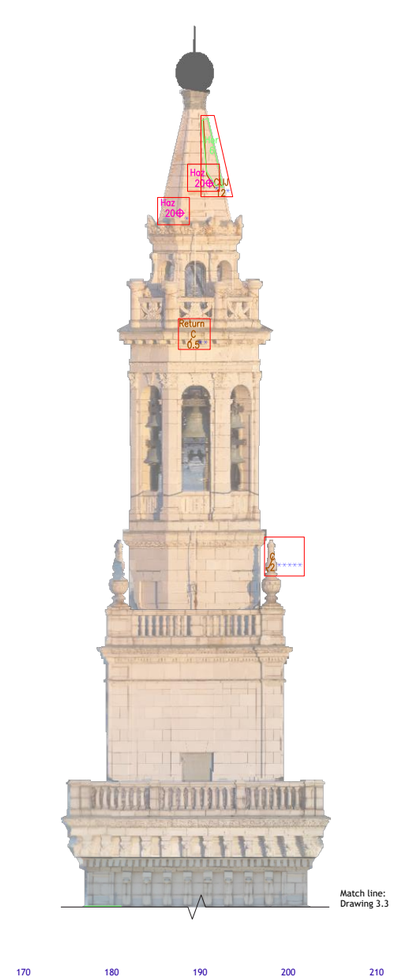
Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935



4.1 Southeast

4.2 Northeast



4.3 Northwest

4.4 Southwest

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		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32 inch	
		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	Number of units
		HV	Hortz. & Vert. disp.	1 0 to 1/8 inch	
				2 1/8 to 1/4 inch	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk	Mortar Caulked	Not Applicable	Length in lin. ft.
		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed	Size of repair in square inches	Not applicable
		D	Dutchman sound		
		PF	Patch Failed		
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric	Not applicable	Area in sq. ft.
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper		
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls		B	Bonded	Size of spall in square inches	Not applicable
		Haz	Hazardous		
		I	Incipient		
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss in 1/8" increments:	Area in sq. ft.
		Erd	Eroded	1 0 to 1/8 inch	
		Glz	Glaze loss	2 1/8 to 1/4 inch	
Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

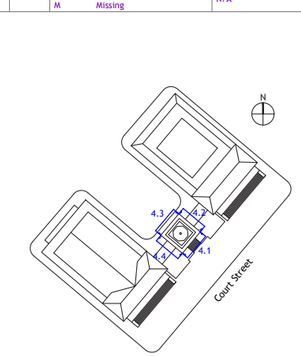
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan

SURVEYED USING tpas
SURVEY DATE: October 23-26 BY: PC, KDs, KO, MP, KS
VERTICAL access
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

ELEVATIONS
TERRA COTTA BELFRY & OBSERVATION LEVELS - PRIORITY 1 CONDITIONS

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

Building Structure

Silman

111 Devonshire Street
Boston, MA 02109

Project Team:

Ben Rosenberg PE
Johnpatrick Connors

- Structural Code and Scope Feasibility Report
- Existing Conditions Probe Assessment and Report

Silman

Structural Engineers

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October 28, 2019

Ken Guditz, Senior Associate
Bruner/Cott Architects
225 Friend Street, Suite 701
Boston, MA 02114

RE: Springfield Campanile – Structural Code and Scope Feasibility Report
Silman Project No 18496

Dear Ken:

Attached is our Structural Code and Scope Feasibility Report for the Springfield Campanile. Please don't hesitate to contact our office with any questions.

Sincerely,

Benjamin Rosenberg, PE
Principal

INTRODUCTION

The Springfield Campanile is a steel framed clock tower with unreinforced masonry infill walls clad with limestone and terra cotta, measuring approximately 300 feet in height. The building is located in Springfield, Massachusetts and is bounded by Pynchon Street to the north, Springfield City Hall to the east, Court Street to the south, and Springfield Symphony Hall to the West.

The tower was originally constructed between 1911 and 1913. Deterioration of the cladding, most notably at the top portion of the tower, prompted a restoration effort that commenced in June 1966. Restoration of the top portion of the tower included removal and replacement of structural steel framing, limestone, and terra cotta ornamentation. In the years since the restoration, the limestone façade has continued to deteriorate on all four facades to an extent where protective netting has been installed at the north, east, west, and south corners of the building to mitigate the risk of limestone falling from the building.

This report will discuss the existing structure of the tower, applicable code requirements for the proposed renovation and restoration, and structural work associated with the effort.

Silman conducted a probe campaign to observe and assess the existing structure of the tower. The probe campaign included discrete limestone and brick removals on the lower portion of the tower. Please refer to the separate "Existing Conditions Probe Assessment and Report" for discussion of the probes and observed existing structure, as well as restoration options.

DOCUMENTATION

Silman reviewed the following documentation related to the building:

1. Partial set of original structural and architectural drawings produced by Pell and Corbett Architects dated November 24, 1909. This included four drawings: tower foundation plan, tower framing plan/elevation, and two architectural drawings.
2. Partial set of structural and architectural drawings from the 1966 repair of the tower by Hoyle, Doran and Berry Architects, dated 4/18/66, as well as additional drawings by the same architect documenting existing cracks and damage at the tower façade.
3. "Feasibility Study for Repairs to Campanile Tower", by Stopfel, Inc. Architects, dated July 1999.
4. A series of newspaper clippings and other similar archive information on the tower provided by Bruner/Cott Architects (BCA). This compilation includes publicly-available material.
5. Photographs of the tower's original construction provided by the City of Springfield. The photographs show the erection of the tower structure and cladding throughout the original construction period.
6. "Existing Building Code Thresholds Report", by AKF, dated September 19, 2019.
7. "Elevator Modernization Survey" by Lerch Bates, dated October 21, 2019, and associated email correspondence from Lerch Bates with additional information on the new proposed elevator.

EXISTING TOWER STRUCTURE

The tower structure is comprised of a steel frame with unreinforced masonry infill. The steel frame has built-up steel columns at the four corners. Each column consists of two channels with welded web stiffeners and flange closure plates. There is a note on Pell and Corbett drawing T1 that "All columns to be filled with cement", though it is unknown if this was done or what the

condition of the fill is. The beams at each framing level generally consist of back-to-back channels of varying depth and weight, sometimes with top and/or bottom plates. All four sides of the tower have a combination of x- and chevron-bracing with steel plate braces that connect to columns and beams through gusset plates. All connections are rivated. The steel framing steps inboard of the masonry walls in the belfry section at the top of the tower.

The interior shaft of the tower consists of a main staircase running around the perimeter. The stair is framed with steel stringers and landing members supported on the perimeter tower steel framing. The open elevator runs up the center of the tower. The landings at the top of the building are supported on concrete decks cast on steel beams which are encased in concrete.

Per an unlabeled Pell and Corbett, the tower bears on three layers of steel grillage which in turn bear on a 1'-6' thick concrete mat slab. The columns bear on five 20" deep wide-flange beams, which in turn bear on twelve 24" deep wide-flange beams, which finally bear forty-five 24" deep wide-flange beams on top of the mat slab. The reinforcement of the mat slab is not shown or known, if any. The design bearing pressure or the presence of any deep foundation elements is also unknown. No geotechnical investigation, foundation probes, or test pits were performed.

The masonry walls are brick with a consistent thickness, though the tower exterior tapers as you go up the structure. The walls bear on the steel beams at each level, though it is unlikely that the brick is tied or positively connected to the steel structure. The steel framing and masonry act together to provide stiffness to the building. The building cladding is limestone to the top of the clock, and terra cotta above that up to and through the belfry. There are 12 bells in the carillon assembly in the belfry, supported on steel beams framing to steel columns clad in terra cotta.

STRUCTURAL CODE REVIEW

The applicable code is the Massachusets State Building Code 780 CMR, 9th edition, which incorporates and amends the International Building Code, 2015 edition (IBC), and the International Existing Building Code, 2015 edition (IEBC). As an existing building, the renovation and restoration work on the tower is governed by IEBC. IEBC prescribes three potential compliance methods for work on the tower. This structural report assumes that the work-area method will be used, in keeping with the compliance method we most often see used as well as the AKF code report. We assume no change in occupancy to the building.

The AKF report determines that the proposed work qualifies as a Level 1 alteration. Level 1 alterations include "the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose." No spaces can be reconfigured, no doors or windows can be added or removed, and no reconfiguration of extension of any system, or installation of additional equipment, is permitted. We assume that the removal and replacement of the elevator, including supporting equipment, qualifies under this Level 1 alteration description, but these must be confirmed. For Level 1 alteration, the applicable structural item is: Given that we assume all roof coverings will be reinstalled or replaced in kind and not increase the load on the existing structure, no structural reinforcement is required to support new roofing assemblies.

Level 1 alterations do not include discussion of new structural members or revision of existing members. Because we anticipate new structural members or reinforcement of existing members as part of the tower scope of work, we thus include the Level 2 alteration discussion of structural members here. A Level 2 alteration includes "the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or

the installation of any additional equipment." We understand that none of these items are included in the proposed scope of work.

Per IEBC, all new structural members must conform to current IBC. This includes, for example, the new elevator steel discussed below. All existing members that see more than a 5% increase in gravity load must comply with current IBC. This includes, for example, the structural members at the top of the elevator shaft that will be carrying the machine room loads, which will likely be significant and cause an increase in gravity stress of more than 5%. We are not increasing the design lateral loads on the tower by more than 10% and thus do not need to revise any existing lateral load-carrying structural members.

Repairs to the existing structure are governed by Chapter 6 of IEBC. Existing members are permitted to be repaired to their original pre-deterioration conditions. All new members and materials used for the repairs must comply with detailing provisions of IBC. (This has been included in the discussion in the "Existing Conditions Probe Assessment and Report"). The building has not undergone substantial structural damage as defined in IEBC. As a hisoric building governed by Chapter 12 of IEBC, the tower must still conform to the aforementioned sections of IEBC.

EXISTING STRUCTURE SEISMIC ANALYSIS

The existing structure of the tower is neither designed nor structurally adequate to carry current code-mandated seismic loading per the parameters and loading described in the "Structural Design Guidelines" section below. It is important to note that IEBC does not mandate upgrading the existing building structure to conform to current code except for discrete and affected elements as described above. Thus, retrofitting or reinforcing the existing structure to meet current code loading or a percentage of current code loading is not required by code and would be voluntary.

A seismic retrofit of the tower is, of course, structurally feasible, though it would be extremely expensive. Existing members – columns, beams, and braces – and connections would need to be reinforced or, if necessary and sensible from a cost standpoint, replaced. Some of the existing masonry backup would need to be removed to install reinforcement. The existing steel would be tested for composition and weldability to ensure connections were appropriately designed. Reinforcement would be designed to remain concealed within the existing wall structure as much as possible to minimize the effects on aesthetics.

STRUCTURAL SCOPE ITEMS

1. *Exterior façade and perimeter structural repair*: Please see the "Existing Conditions Probe Assessment and Report" for structural scope items related to the exterior façade repair of the tower.

2. *Removal of existing elevator and installation of new elevator:* Per Lerch Bates, the existing water hydraulic elevator is to be removed and replaced with a new gearless traction elevator. The existing elevator pit extends to the foundation level, but the new elevator will not require as deep a pit. New structural steel framing can be installed at the desired pit level to support the elevator rails, buffers, counterweight, and other pit loads. The new steel framing layout will be coordinated with the required elevator equipment support locations,

and will frame into the pit masonry or concrete walls, either with new beam bearing pockets or faceplates attached with post-installed anchors.

The elevator rails will require backup structural support the entire height of the pit and open shaft. We assume that we may be able to utilize the existing stair framing adjacent to the shaft on several sides but recommend that new backup structure be included in scoping at this phase. Each rail will require an HSS column that is anchored back to the perimeter stair structure at regular intervals and designed to accommodate the elevator rail loads for strength and maximum 1/8" deflection. The backup structure will bear at the elevator pit framing.

We assume that there will be elevator machinery at the top of the shafts, including sheave beams, hoist beam, possibly safety beam tie-offs, and other structural steel to support elevator loads. These beams are sometimes provided by the structural steel subcontractor and sometimes by the elevator contractor. In either case, they will need to be designed for the elevator machinery loads, which can be quite high in these applications. The sheave beams in particular have very strict deflection criteria of L/1666 and will need to be sized accordingly. All new steel will be framed to existing tower steel framing, and it is possible that existing steel framing needs to be reinforced to support elevator loads. Per IEBC, any existing framing members that see an increase in gravity loading of more than 5% from new elevator reactions will need to comply with current code or be reinforced. This likely affects only discrete members at the top of the tower as the weight of the building below the elevator machinery level begins to accumulate very rapidly.

The tower structure as a whole will be analyzed to confirm that it can support the elevator loads, and the structure will be reinforced if necessary.

3. *Bell support at carillon assembly*
   Per BCA, the bell consultant or subcontractor will be providing new bell support framing and isolation. We assume this will include removal of the existing bell support steel beams and installation of new bell support beams with isolation either at the connection points of the steel beams or at the bell connection points. The design of these beams and connections is to be by the bell consultant or subcontractor.

STRUCTURAL DESIGN GUIDELINES

Applicable Codes & Standards

The project will be governed by the following codes:

- 780 CMR 9th ed. Massachusetts State Building Code
- 2015 International Building Code (IBC) with amendments
- 2015 International Existing Building Code (IEBC) with amendments

The following standards will be followed as specified by the governing codes:

- ASCE 7-10 Minimum Design Loads (and Associated Criteria) for Buildings and Other Structures
- ACI 318-14 Building Code Requirements for Structural Concrete
- ACI 530-13 or TMS 402-2013 Building Code Requirements for Masonry Structures

- NDS-2015 National Design Specification (NDS) for Wood Construction with 2015 Supplement
- AISC 360-10 Specification for Structural Steel Buildings
- ASCE 341-10 Seismic Provisions for Structural Steel Buildings
- ASCE 41-13 Seismic Evaluation and Retrofit of Existing Buildings

Structural Loads

The loads presented below assume the structure is Risk Category III *(ASCE 7-10, Table 1.5-1 and IBC Table 1604.5)*. Determination of whether the Springfield Campanile is Risk Category II or III is an important discussion. Risk Category III is defined, in part, as "Buildings and other structures that represent a substantial hazard to human life in the event of failure...". One of the specific criterion in IBC is "Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300". There is also the qualitative nature of the initial description of Risk Category III. Depending on occupancy load, we may be justified in assigning the building to Risk Category II. However, for purposes of this report, we have assumed Risk Category III given the height of the tower and the occupants of buildings around the site.

Live Loads

The following values are specified by the applicable codes and standards:

Occupancy or Use	***Live Load***	
	Uniform (psf)	***Concentrated (lbs)***
Public access – stairs, landings, etc.	100	
Elevator machine rooms and mechanical room[Note 1]	75	300 lbs on grating on area of 2" x 2".

Note 1: Weight of elevator and MEP equipment and elevator reactions are taken in lieu of distributed live load over the area of the equipment

Snow Loads

The following loads and parameters are specified by the applicable codes and standards:

- Ground Snow Load *(780 CMR 9th Ed.* Table 1604.11*)* p_g = 35 psf
- Terrain Category/*Exposure (ASCE 7-10, §26.7)* C
- Exposure Factor *(ASCE 7-10, Table 7-2)* C_e = 0.9 (Fully Exposed)
- Thermal Factor *(ASCE 7-10, Table 7-3, Table 7-2)* C_t =1.2
- Importance Factor *(ASCE 7-10, Table 1.5-2)* I_s = 1.10
- Flat Roof Snow Load *(ASCE 7-10, Eqn. 7.3-1)* p_f = 35 psf

Wind Loads

- Ultimate Wind Speed *(780 CMR 9th Ed.* Table 1604.11*)* V_{ult} = 128 mph
- Serviceability Wind Speed (IBC 2015 *§1609.3.1)* V_{asd} = 100 mph
- Wind Directionality Factor *(ASCE 7-10, Table 26.6-1)* K_d = 0.85
- Exposure Category *(ASCE 7-10, §26.7)* C

- Topographic Factor *(ASCE 7-10, §26.8)* K_{zt} = 1.0
- Gust Effect Factor *(ASCE 7-10, §26.9)* G = 0.85
- Enclosure Classification *(ASCE 7-10, §26.10)* Enclosed
- Internal Pressure Coefficient *(ASCE 7-10, Table 26.11-1)* GC_{pi} = +/- 0.18
- Velocity Pressure *(ASCE 7-10, Eqn. 27.3-1)*

Assumes existing building height = 300 ft q_z = 57 psf

- Design Wind Pressure *(MWFRS)* p = TBD
- Design Wind Pressure *(C&C)* p = TBD

Seismic Loads

The seismic parameters dependent on soil shall be confirmed by a geotechnical engineer. The seismic force-resisting system has been assumed as a steel system not specifically detailed for seismic resistance.

- Soil Site Class *(Assumed)* D
- Short Period Mapped Spectral Accel. *(780 CMR 9th Ed.* Table 1604.11*)* S_s = 0.173 g
- One Second Period Mapped Spectral Accel. *(780 CMR 9th Ed.* Table 1604.11*)* S_1 = 0.065 g
- Short Period Design Spectral Acceleration S_{DS} = 0.185 g
- One Second Period Design Spectral Acceleration S_{D1} = 0.104 g
- Seismic Design Category *(ASCE 7-10 §11.6)* B
- Seismic Importance Factor *(ASCE 7-10, Table 1.5-2)* I_e = 1.25
- Response Modification Coeff. *(ASCE 7-10, Table 12.2-1)* R = 3
- Overstrength Factor *(ASCE 7-10, Table 12.2-1)* Ω_O = 3
- Deflection Amplification Factor *(ASCE 7-10, Table 12.2-1)* C_d = 3

Serviceability

The serviceability criteria shall be the most restrictive of either those in applicable code reference, or those presented below, for new and reinforced members:

Gravity Deflections

- For roof members live/snow load deflection shall not exceed l/240, and the dead + live load deflection shall not exceed l/180.
- For floor members the live load deflection shall not exceed l/360, and the dead + live load deflection shall not exceed l/240.
- For members supporting plaster ceilings the live load deflection shall not exceed l/480, and the dead + live load deflection shall not exceed l/360.
- For members supporting masonry walls the dead + live load deflection shall not exceed l/600.

Lateral Deflections

We understand that the existing tower structure will not be retrofitted for current code lateral drift requirements.

Vibrations

No criteria have been provided to limit vibrations for sensitive equipment or sensitive historic fabric. Where human comfort is the criteria for limiting pedestrian induced motion, floor framing vibration due to footfall vibrations will be verified. Where vibrations are caused by running machinery, they should be isolated by damping devices or by the use of independent foundations. The bells at the carillon assembly will be isolated on new structure.

CONCLUSION

The proposed renovation and repair scope for the Springfield Campanile, as discussed both here and in the “Existing Conditions Probe Assessment and Report”, is structurally feasible. A seismic retrofit to bring the existing structure up to current code loading is also feasible but not mandated by code.

Silman

Structural Engineers

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October 3, 2019

Ken Guditz, Senior Associate
Bruner/Cott Architects
225 Friend Street, Suite 701
Boston, MA 02114

RE: Springfield Campanile – Existing Conditions Probe Assessment and Report
Silman Project No 18496

Dear Ken:

Attached is our Existing Conditions Probe Assessment and Report for the primary structural steel framing of the Springfield Campanile. This report summarizes our findings from a probe campaign and discusses options for partial or full restoration of the existing structure. Please don't hesitate to contact our office with any questions.

Sincerely,

Benjamin Rosenberg, PE
Principal

BACKGROUND

The Springfield Campanile is a steel framed clock tower clad with limestone and terra cotta, measuring approximately 300 feet in height. The building is located in Springfield, Massachusetts and is bounded by Pynchon Street to the north, Springfield City Hall to the east, Court Street to the south, and Springfield Symphony Hall to the West.

The tower was originally constructed between 1911 and 1913. Deterioration of the cladding, most notably at the top portion of the tower, prompted a restoration effort that commenced in June 1966. Restoration of the top portion of the tower included removal and replacement of structural steel framing, limestone, and terra cotta ornamentation. In the years since the restoration, the limestone façade has continued to deteriorate on all four facades to an extent where protective netting has been installed at the north, east, and south corners of the building to mitigate the risk of limestone falling from the building.

The purpose of our investigation was to observe the condition of the steel frame and make correlations between the deterioration of the limestone façade and the condition of the steel frame. The current evaluation was based on probes of the exterior façade at 6 select locations.

Silman reviewed the following original structural drawings produced by Pell and Corbett Architects dated 24 November 1909: Municipal Tower, Tower Foundation. We also reviewed additional architectural drawings T2 and T3 by Pell and Corbett, as well as a series of architecural and structural drawings by Hoyle, Doran and Berry Architects, dated 4/18/66. In addition, we reviewed a series of newspaper clippings and other similar archive information on the tower provided by BCA. The building superstructure is a steel frame consisting of built-up steel columns, girders, beams, and diagonal braces. All four sides of the tower have x- or chevron-bracing the full height. At the belfry, rolled steel beams span across the perimeter window openings and across the belfry to support the bells. The tower superstructure is founded on a grillage of steel beams at the base bearing on a concrete slab of unknown thickness and properties.

This report primarily discusses the existing conditions and repair options for the primary structural steel frame. See the accmpnying report by Simpson Gumpertz & Heger for discussion of the existing conditions and repair of the exterior limestone cladding and backup masonry.

PROBE OBSERVATIONS

On 12 April 2019 Johnpatrick Connors of Silman visited the site to observe probes in the exterior limestone façade. Weather was cloudy with an ambient temperature of 46 Degrees Fahrenheit. We accessed the probes using a boom lift provided and operated by Summit Masonry. Our field observations consisted of photographing the probes, taking measurements of structural steel, and documenting our visual observations. No materials testing or removal of structural steel for laboratory analysis was performed.

PROBE P1

Probe P1 is located on the northwest elevation approximately 45 feet above ground. This probe was made to observe the lintel or other structural support condition at the spandrel beam. Our observations are as follows:

1. We observed the top flange of a steel beam with a steel plate attached to the top flange. Both steel elements are heavily corroded. We measured the top flange of the steel beam is 0.73 inches and the corroded steel plate is approximately 0.47 inches thick. The corrosion tends to worsen towards the left end of the probe.
2. We observed a coroded steel kerf anchor. The head of the anchor measures approximately 1 inch wide with an approximate thickness of 0.125 inches and extends approximately 2 inches from the outside face of the brick masonry infill.

Photograph 1 Overall photo of Probe 1 at the northwest elevation. Note corroded steel beam indicated by red arrow (shown close up in **Photograph 2**).

Photograph 2 Close up photo of corroded steel beam flange at Probe P1 indicated by red arrow (Photo courtesy of Bruner/Cott Architects)

Photograph 3 : Close up photo of corroded kerf anchor indicated by red arrow.

3

PROBE P2

Probe P2 is located on the northwest elevation approximately 35 feet above ground. This probe was made to determine the limestone support condition at mid-height between floor landings. Our observations are as follows:

- We observed a steel beam, and braces (angles) framing to the gusset plate.
- The steel at this probe location varies in hardness with a noticeable soft spot indicated in **Photograph 6**.
- The steel at Probe P2 is generally in better condition than other probe locations.

Photograph 4 : Steel angle braces and beam framing to gusset plate at Probe P2.

4

Photograph 5 : Steel beam flange at Probe P2 measuring approximately 0.375 inches.

Photograph 6 : Soft spot in steel plate at Probe P2 indicated by red arrow.

PROBE P3

Probe P3 is located on the northeast elevation approximately 45 feet above ground. This probe was made to observe the structural steel at a corner column location.

- We noted a vertical element at the right end of the probe which is highly coroded and shows considerable section loss. We were able to easily remove coroded steel with an awl (**Photograph 8**).
- We observed a fractured steel rivet head with considerable corrosion (**Photograph 9**).
- The steel beam flange exhibits lammelar corrosion at the right end of the probe where oxidation has propogated along the grain boundary of the material resulting in a “layered appearance” of the steel (**Photograph 9**).
- Genereally, the corrosion worsens towards the corner (right) of the building. The steel at the left end of the probe shows less surface corrosion (**Photograph 10**).

Photograph 7 : Overview of Probe P3. Note reduction in limestone thickness covering steel beam flange indicated by red arrow.

Photograph 8: Considerable corrosion and section loss of vertical steel element at Probe P3.

Photograph 9: Close up photo of Probe P3. Note highly corroded and fractured rivet head indicated by the red arrow. Also note the corrosion of the steel beam flange indicated by the blue arrow (photo courtesy of Bruner/Cott architects).

Photograph 10: Photo at the left end of Probe P3 showing vertical steel element generally in good condition.

PROBE P4

Probe P4 is located on the northwest elevation approximately 43 feet above ground. This probe was made to obeserve a lintel or other structural steel support at the mid-height between floor landings.

- We observed a structural steel beam which exhibits surface corrosion. The beam flange and plate shows signs of corrosion and expansion.
- The steel rivet heads show surface corrosion but are generally intact.

Photograph 11: Overview of Probe P4.

Photograph 12: Measurement of steel beam flange and plate at Probe P4.

Photograph 13: Structural steel, gusset plates, and rivet heads at Probe P4.

PROBE P5

Probe P5 is located on the northeast elevation directly below a window approximately 45 feet above ground. Probe P5 was made to observe a steel lintel or other structural support condition at the spandrel beam. Our observations are as follows:

- We observed a structural steel beam with a steel plate attached to the top flange. The beam supports 5 courses of brick masonry above.
- The beam flange shows considerable corrosion and volumetric expansion. The steel plate exhibits surface corrosion. We measured the steel plate is 0.375 inches thick and the steel beam flange is 0.6 inches thick at the location indicated by the red arrow in **Photograph 14**.
- The steel rivet heads show considerable corrosion as indicated in **Photograph 15**

Photograph 14 : Overview of Probe P5. Red arrow indicates severe corrosion of steel flange shown in a close-up view in **Photograph 15**

Photograph 15 : Corrosion of steel beam flange and rivet head at Probe P5.

PROBE P6

Probe P6 is located on the southwest elevation approximately 50 feet above ground. Probe P6 was made to observe the condition of the structural steel at this location. Our observations are as follows:

- We did not observe any structural steel at this probe location.
- We observed brick masonry covered by a cementitious infill material.

Photograph 16 : Overview of Probe P6

4.0 SUMMARY

The Springfield Campanile's steel frame is responsible for the overall gravity and lateral stability of the structure. It is likely that the masonry infill and cladding also contributes to the de facto lateral stiffness of the building, though the presence of steel braced frames on all four sides makes it likely that the Campanile was orginally designed to rely on the steel frame alone for lateral stability. Based on our limited observations of the steel frame at select probe locations, we have identified several recurring structural field conditions that are indicative of the presumed condition of the steel framing as a whole and should be addressed as part of the overall restoration of the structure.

1. Primary steel framing members – spandrels, braces, etc. – show varying degrees of corrosion. Some observed members have no or very minimal corrosion and are in excellent condition. Other members have varying degrees of corrosion, including some with significant rusting and delamination of flanges and webs. We also observed pitting of beam webs in at least one location.
2. A number of rivets throughout the observed probes are significantly corroded, some to the point where they are not performing structurally. Since these rivets are responsible for transferring forces between the primary framing members, it is critical that repair of connections be discussed as part of the overall restoration strategy.
3. Corrosion of beams, lintels, and relieving angles have caused rustjacking of the limestone façade, which in turn is responsible for some of the observed cracking and movement of the façade stones.

Because the current probe campaign was limited to the lowest 30 feet of the building due to accessibility issues and owner-directed scope, the condition of the steel frame at higher elevations is currently uncertain. However, given our experience, we surmise that corrosion of the steel frame likely exists throughout the frame and could potentially be worse at higher elevations due to the higher potential for water infiltration.

From our observations of the probes it is evident that there has been water infiltration and corrosion of steel to varying degrees throughout the structure. Corrosion of the steel observed at the select probe locations appears to worsen towards the corners of the building. In addition, we observed higher levels of surface corrosion and section loss of spandrel beam flanges and connecting elements where the thickness of the limestone cladding has been reduced to fit around the steel or where the cladding piece is thinner.

Given the variability in the condition of the steel structure, some structural elements that are generally sound, but exhibit surface corrosion will require localized scraping and repainting. Other areas require considerably more involved structural repairs due to the severity of the deterioration of elements such as corroded steel beam flanges and failed rivet heads. Elements with worsened deterioration will require reinforcement or replacement of structural steel to ensure adequate safety and performance of the structure.

To address the above-mentioned structural concerns, we have developed several repair strategies of varied comprehensiveness, cost, and associated risk which are explored in more detail in the subsequent sections. It is essential to realize that any repair program which uses the limited observations from the seven exterior probes discussed in this report and extrapolates potential structural deterioration comes with inherent risk. The risk in using the seven probes as a basis for repairs is especially high because there are conditions we have not

observed. As such, we recommend adding additional probes to more thoroughly assess the existing structural condition at higher elevations and around the building perimeter. Additional probes will add to our understanding of the structure and help inform the repair strategy. Having additional probes, especially at higher elevations, could potentially provide valuable insight as to the effectiveness of the options outlined below.

For pricing purposes, we have outlined four repair options:

Option 1A
This is termed a minimal repair option and uses the observations from the seven probes discussed in this report to extrapolate the needed repairs over the entirety of the structure. This option involves removing the limestone cladding at all stair landing levels to expose spandrel beams and gravity connections to columns including corner column locations as informed by the masonry repair work. Steel repairs may include the following:

1. Removal of corroded rivets and replacement with new stainless steel bolts: Remove corroded rivets. Access to the rear side of the connection will be necessary to remove all corroded material. Scrape rust off of existing hole and surrounding steel, and paint with corrosion resistant paint. Paint shall be selected based on testing and compatibility with existing steel, to occur during design phase through mockups and consultation with manufacturer. Assume paint shall be by Tnemec. If necessary based on observed corrosion, either install new plate to repair deteriorated section or drill new hole through both connected parts (assume 25% of holes will need to be redrilled or plated). Install new stainless steel bolt with stainless steel nut and washer (assume ¾" diameter bolt). Provide dielectric separation between stainless steel material and existing carbon steel (paint will be able to achieve this where installed).
   Assume 15% of exposed rivets will be required to be replaced.
2. Repair of steel members: Scrape existing rust off existing members to SSPC-SP3 standard. Allow for measurement of remaining good steel, including thickness of steel sections, to determine if plating or other reinforcement will be needed. Assume welding or bolting of new plate steel to reinforce deteriorated sections. For pricing, assume 3/8" thick plates. Paint existing steel, similar to item 1 above. Note: The scope here may vary widely, both because of observed steel conditions and the current unknowns, and because it is a design decision as to how much to rely on the repaired exterior envelope to prevent future water infiltration and thus future corrosion. Thus, we offer two sub-scopes here:
   Scope 1: Assume 100% of exposed existing steel will be scraped and painted. Assume 3% of linear length of steel will be repaired.
   Scope 2: Assume 50% of exposed existing steel will be scraped and painted. Assume 3% of linear length of steel will be repaired.
3. Replacement of existing façade support steel: Remove deteriorated relieving angles that directly support exterior façade. Replace with new hot-dip galvanized or stainless steel angles, welded or bolted to existing steel structure.
   Assume 50 linear feet of existing angle shall be removed and new L8x6x1/2 angle installed.

Please note that the assumptions on quantities and repairs noted here are based on limited observation and engineering judgment. This option addresses areas that we assume are most problematic based on engineering judgement and experience. The major disadvantage of this repair strategy is that it only addresses issues at primary building levels. As such, corrosion of the steel and associated spalling of limestone at the corners of the building will likely persist in the areas that have not been treated. This option also relies on an assumption of areas of most

significant deterioration based on limited probe and exterior façade observation and will not address the full scope of issues (including potentially serious deficiencies).

Option 1B
This option includes the same scope items as Option 1A with the addition of an impressed-current cathodic protection system. This option is referred to as the minimal repair option with cathodic protection. Cathodic protection is a means of mitigating future corrosion of metals using an electrical cell. The impressed-current cathodic protection system will only work for steel that is in direct contact with masonry. The benefit is that steel embedded in masonry, even if only some of the steel faces are embedded, can be protected from future corrosion without removing the steel member or brick masonry. For the cathodic protection system to function it will require continuous electrical supply and monitoring. Additionally, it should be noted that the benefits of adding the cathodic protection system can be very difficult to quantify due to the uncertainty in the amount of steel in contact with masonry, among other factors. As such, cathodic protection is being offered because it has the potential to mitigate further corrosion of the steel but the exact benefits are difficult to quantify without additional probing and consulting from a professional specializing in the design and installation of cathodic protection systems. This professional will be able to better determine the requirements for the proposed system, including quantity of anodes, power supply, data transmitters, etc. The type, size, and location of the anodes, power supply, etc. shall be provided by the cathodic protection consultant.

Option 2
This option uses the same approach as Options 1A and 1B but will involve removal of limestone cladding in order to expose the entire steel frame including columns, column splices, spandrel beams, diagonal braces as well as lateral and gravity connections. Where limestone is left in place or does not need to be removed to expose steel it must be temporarily shored. The scope can be assumed to be as follows:

1. Removal of corroded rivets and replacement with new stainless steel bolts: Remove corroded rivets. Access to the rear side of the connection will be necessary to remove all corroded material. Scrape rust off of existing hole and surrounding steel, and paint with corrosion resistant paint. Paint shall be selected based on testing and compatibility with existing steel, to occur during design phase through mockups and consultation with manufacturer. Assume paint shall be by Tnemec. If necessary based on observed corrosion, either install new plate to repair deteriorated section or drill new hole through both connected parts. Install new stainless steel bolt with stainless steel nut and washer (assume ¾" diameter bolt). Provide dielectric separation between stainless steel material and existing carbon steel (paint will be able to achieve this where installed).
   Assume 15% of rivets will be required to be replaced.
2. Repair of steel members: Scrape existing rust off existing members. Allow for measurement of remaining good steel, including thickness of steel sections, to determine if plating or other reinforcement will be needed. Assume welding or bolting of new plate steel to reinforce deteriorated sections. For pricing, assume 3/8" thick plates. Paint existing steel, similar to item 1 above. Note: The scope here may vary widely, both because of observed steel conditions and the current unknowns, and because it is a design decision as to how much to rely on the repaired exterior envelope to prevent future water infiltration and thus future corrosion. Thus, we offer two sub-scopes here:

Scope 1: Assume 100% of existing steel will be scraped and painted. Assume 3% of linear length of steel will be repaired.
Scope 2: Assume 50% of existing steel will be scraped and painted. Assume 3% of linear length of steel will be repaired.

3. Replacement of existing façade support steel: Remove deteriorated relieving angles that directly support exterior façade. Replace with new hot-dip galvanized or stainless steel angles, welded or bolted to existing steel structure.
   Assume 50 linear feet of existing angle shall be removed and new L8x6x1/2 angle installed.

The advantage of Option 2 is that it will address deterioration of the entire observable steel frame. The greatest drawback of this option is that it creates significant logistical challenges associated with providing temporary support for limestone cladding where it does not otherwise need to be removed. For instance, there are many areas of limestone directly above the x-brace intersections that do not need to be removed to expose the steel framing, but this limestone will need to be temporarily shored due to removals below. The cumulative amount of limestone to remain but be shored is significant and will be very costly. Removal of the limestone for the Option 2 scope and shoring of limestone to remain may, in fact, be more onerous than removing the full cladding due to shoring requirements and the "checkerboard" pattern of removals. As a result, we do not recommend Option 2.

Option 3

This option is a comprehensive repair program that addresses the entirety of the existing structural conditions, in which the goal is to extend the life of the building to a desired timeframe. The scope is the same as Option 2. Unlike Option 2, this strategy would require removing the limestone cladding on the entire tower and selective removals of backup brick masonry to expose the full steel frame, allowing observation of the steel and determination of the appropriate level of repair for each member and connection. Option 3 would also include scraping and repainting all exposed steel and potentially implementing a cathodic protection system to prevent future deterioration of the steel where observed existing masonry conditions warrant. This option includes the same steel repair scope as Option 2 but eliminates the need for complex and costly shoring of limestone to remain. There are of course costs associated with removal and, presumably, restoration/repair of the additional portions of removed façade, but this seems to be a much better use of money.

5.0 CONCLUSION

In summary, Option 3 is the most effective strategy for preserving the Springfield Campanile because it addresses all observable existing deteriorated conditions. However, the significant cost and schedule implications associated with this option make it logical to offer other options so that the City of Springfield can make an informed decision on the desired repair program. Thus, we also offer minimally invasive repair plans (Options 1A and 1B) to address what may be surmised as the most critical areas of repair. We also offer Option 2 which exposes the entire steel frame and leaves limestone in place where it is not in direct contact with structural steel.

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CAMPANILE REPAIRS AND RESTORATION PROJECT
SPRINGFIELD, MASSACHUSETTS

TERRA COTTA CONDITIONS-INSPECTION AND FINDINGS
October 2019

INTRODUCTION

On October 26, 2018, Building Conservation Associates, Inc. (BCA) was on site to perform a preliminary walkthrough to evaluate the terra cotta portion of the Springfield Municipal Group's Campanile, located at 34-36 Court Street, Springfield, Massachusetts. The Campanile, located in the center of the complex, is one of three structures that make up the Springfield Municipal Group (the other two structures are Symphony Hall to the southwest and the City Hall to the northwest). The Springfield Municipal Group is part of the Court Square Historic District, which was designated in 1974.

Designed by the New York City-based firm, Pell & Corbett, the Campanile and its adjacent buildings were constructed congruently from 1909 to 1913. The tower is approximately 300 feet tall and 25 by 25-feet wide, with limestone and terra cotta cladding. The terra cotta clad section is located at the top 1/3 of the tower above the clocks. A complete record of past maintenance and repairs was not available for this report, but a collection of newspaper articles obtained from Bruner/Cott Architects provides some information on the deterioration of the tower's terra cotta, limestone, and steel structure from the mid-1900s through the 1970s. By 1947 it appears that the deteriorating terra cotta had become a safety risk to pedestrians below resulting in the area being blocked off. An article from August 13, 1947, states that the city awarded a contract to repair the Campanile months after large chunks of terra cotta had fallen from the tower to the esplanade below.[1] The tower continued to deteriorate over the next two decades, which led to a 1967 reconstruction project that cost the city approximately $650,000.

An article dated October 29, 1967 states that the original terra cotta units were in deplorable condition due to water seepage, and that the material was "crumbling". The article goes on to state that this crumbling was significant enough to justify the 1967 reconstruction project and the $650,000 cost to the city. According to the 1966 stamped construction drawings and newspaper articles around the time, the terra cotta section of the tower was completely disassembled, including the steel frame, and reconstructed. In addition to rebuilding the tower, the bell supports were replaced, along with upgrades to the heating and electrical systems. The architect for the reconstruction project was Hoyle, Doran, and Berry Architects of Boston, Massachusetts (currently Cram and Ferguson Architects LLC). According to the newspaper articles, A. Belanger Co. of Cambridge, Massachusetts was the restoration contractor, and Federal Seaboard Terra Cotta Co. of Perth Amboy, New Jersey is listed as the terra cotta replacement manufacturers (both companies have since closed.)

[1] "Frank Gerliep, the Human Fly, Starts Job of Repairing the Campanile Tower," Springfield (Massachusetts) Daily News, 13 August 1947.

BCA's role in this project is to assess the condition of the Campanile's terra cotta cladding, in conjunction with findings from the existing conditions survey performed by Vertical Access (VA). Based on the archival information, BCA believes that the current terra cotta on the tower dates from the 1960s. In this report, the area containing the bells shall be referred to as the bell house. Areas below the bell house shall be referred to as either the lower or upper observation levels. The areas containing the bell house and above chamber shall be referred to as either the lower or upper belfry. At the time of the Oct 2018 walkthrough, BCA could only access areas visible from the decks of the lower and upper observation levels and the deck of the bell house (see Figure 1).

This report summarizes the discoveries from BCA's walkthrough and the report from VA; provides treatment recommendations for the various found conditions; and an evaluation of alternate replacement materials. For consistency, this report will use the same terminology used in VA's TPAS system and conditions glossary. The definitions stated in this report are taken from VA's online glossary and can be found at www.verticalaccess.com/glossary.html.

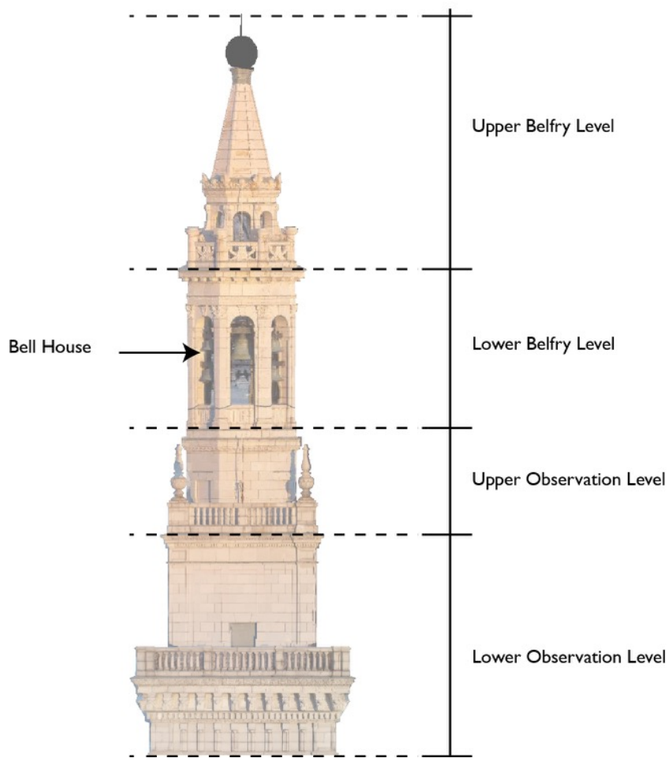

Figure 1. Image of the terra cotta section of the Campanile, illustrating the various zones that will be referred to in this report. Background image provided by Vertical Access.

CONDITIONS ASSESSMENT/SUMMARY OF FINDINGS

Architectural terra cotta is a ceramic cladding material made of fired clay (typically a blend of different types of clay and grog[2]) and can be manufactured either unglazed or glazed. The glaze layer (or slip[3] layer for unglazed terra cotta) helps the unit repel water. Water entering the unit is often the cause for various types of deterioration. The top portion of the Springfield Campanile is clad with an off-white glazed terra cotta. The condition of the terra cotta units ranges from good to failed. Widespread conditions such as cracks, crazing, spalls, open joints, and displacement are present, in addition to various types of soiling and staining. Many of these conditions, such as deteriorated joints and severely cracked units, were cited in a 1999 feasibility study prepared by Stoppel Inc. Architects (based in Boston, Massachusetts) and a 2007 report by CBI Consulting Inc (also based in Boston, Massachusetts). VA noted 553 locations of terra cotta deterioration, ten of which are classified as Priority 1. The Priority 1 conditions range from spalls to cracks through single and multiple units, in addition to cracks through joints.

Cracks

Single Unit Cracks *(Figures 2-4)*

Definition: A crack through a single unit.

Cracks running through a single unit appears to be the most prolific crack condition. This condition can be found on all four elevations and tends to be concentrated either below the lower observation level balustrade or at and above the upper observation level balustrade. VA's survey found 170 single unit cracks, totaling approximately 317 feet.

Some of the more significant cracks can be found in the urns located at the corners of the upper observation level balustrade and the balusters. Most cracks range from hairline (less than 1/32 of an inch) to 1/16 of an inch. However, many of the more significant cracks at the upper observation level balustrade are wider, with the most severe at least a 1/8 of an inch wide. Cracking is a response to external and internal pressures being exerting on the terra cotta.

Cracks can be a sign that internal ferrous metal elements are corroding. These internal components corrode and apply pressure on the surrounding terra cotta unit; this is known as rust jacking. Wider cracks can allow more water to enter the terra cotta body, perpetuating rust jacking. There are many cracks with rust staining, which is another sign that the internal ferrous metal components have begun to corrode. Other potential causes for cracking are structural movement and material shrinkage or expansion.

Notes in the 1966 drawing set state that a 2-inch diameter stainless steel pipe should be installed in the urns on upper observation level deck, and the pipe should be "filled solid with mortar around the pipe". This is likely the cause behind the large cracks in the urns. As the pipe corrodes, it exerts pressure on the mortar around the pipe. Since there is little to no space to accommodate this expansion, the pressure is exerted on the terra cotta and the unit cracks.

Cracks should be repaired as soon as possible to stop water from entering the core of the unit. Depending on the severity of the crack, the unit may be unsound and will need to be replaced. VA identified two Priority 1 single unit crack conditions, one through an urn on the upper

[2] Grog is previous fired clay product added to fresh clay to help control shrinkage, warping, and cracks when the terra cotta unit is drying.
[3] Slip is a mixture of clay and water that is used to provide a protective layer to the terra cotta unit.

observation level and the other through a mutule underneath the upper belfry on the southwest elevation. In the bell house, there are also a couple large cracks through units near the corroded bell supports.

Figure 2: Cracked Urn called out as Priority 1.

Figure 3: One of the many cracked balusters.

Figure 4. Large crack where daylight is visible.

System Units Cracks *(Figures 5-6)*

Definition: A crack through more than one terra cotta unit, crossing, but not following joints.

There are 14 system unit cracks, totaling approximately 78 feet. This type of crack can be found on all elevations. Similar to single unit cracks, system unit cracks are most likely due to rust jacking of internal ferrous metal components, but can also be due to structural movement. Cracks should be repaired as soon as possible to stop water from entering the core of the units. Depending on the severity of the crack, one or more of the units may be unsound and will need to be replaced. All system unit cracks identified by VA are Priority 2.

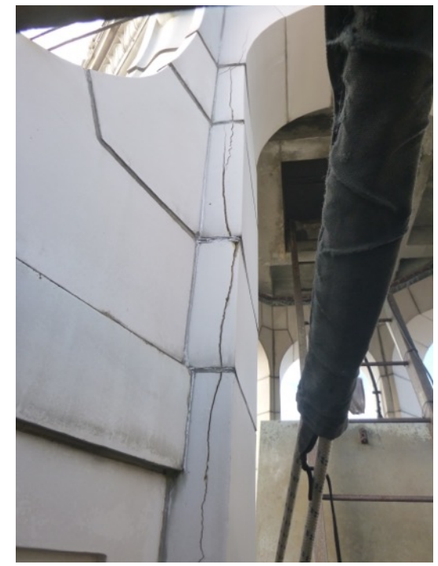

Figure 5. System Units crack affecting five units located on the interior-side of the northeast elevation of the bell house (lower belfry). (VA Report image: 108_264 TerraCotta_Crack System units 2018_2.jpg)

Figure 6. System Units crack affecting two units located on the interior-side of the southwest elevation of the bell house (lower belfry). (VA Report image: 269_264 TerraCotta_Crack System units 2018_1.jpg)

System Units and Joints Cracks *(Figure 7)*

Definition: A crack following the path of two or more connecting joints and passing through one or more masonry units.

There are 14 system unit and joint cracks, totaling approximately 79 feet. Like the other crack conditions, this occurrence can be a sign of rust jacking. Except for two cracks located on the bases and pedestals of urns (located at the north and south corners), this type of crack can be found at and above the bell turret on all elevations. There is one Priority 1 crack of this type located on the northwest elevation of the upper belfry's spire. This crack is approximately 8 feet long and at its widest point is ¾ of an inch. This crack and other conditions in the vicinity may be an indication that water is getting into the structure. Closer observation is greatly suggested to determine if the units or structural system has been compromised.

Figure 7. Priority 1 System Units and Joints crack located on the spire of the upper belfry. Units in area also show signs of glaze spalling/surface loss. (VA Report image 192-274 TerraCotta_Crack System units and joints 2018-1.jpg)

System Joints Cracks *(Figure 8)*

Definition: A crack following the path of two or more connecting joints without any fractured terra cotta units.

VA identified one system joint crack. This crack is located on the spire of the upper belfry, on the southeast elevation. Approximately two feet long and an inch wide at its widest point, this crack and other conditions in the vicinity may be an indication that water is getting into the structure or of structural movement. Like the Priority 1 system unit and joint crack mentioned above, closer observation may be required to determine if the area has been compromised.

Figure 8. System Joint Crack located on the spire of the southeast elevation upper belfry. (VA Report image: 31-282 TerraCotta_Crack System joints 2018-2.jpg

Crazing Cracks *(Figure 9)*

Definition: Small cracks, typically hairline in width and random in pattern, in the glaze of a terra cotta unit.

Crazing is the second most prolific crack condition found on the Campanile, affecting 53 units and covering approximately 191 square feet. This condition occurs due to differential expansion and contraction rates of the glaze layer and the clay body of the unit. This often occurs during the firing process or soon after. When the terra cotta is removed from the kiln, the unit is at its smallest size and then grows over time. As the porous clay body grows, the glaze goes into tension. The random pattern of hairline cracks in the glaze layer (crazing) is the result of the unit trying to release this tension. Crazing is typically a cosmetic condition and does not affect the unit's structural integrity. If extensive enough, the unit can become more susceptible to water absorption.

Figure 9. Example of crazing on a unit.

Repair Failed Cracks *(Figure 10)*

Definition: A crack or crack system that has been filled using elastomeric, cementitious or other repair material in which the repair material exhibits signs of failure or deterioration.

VA documented four failed crack repairs. This condition totals approximately four feet and can be found on the southeast and northwest elevations. The date when these repairs were performed is unknown.

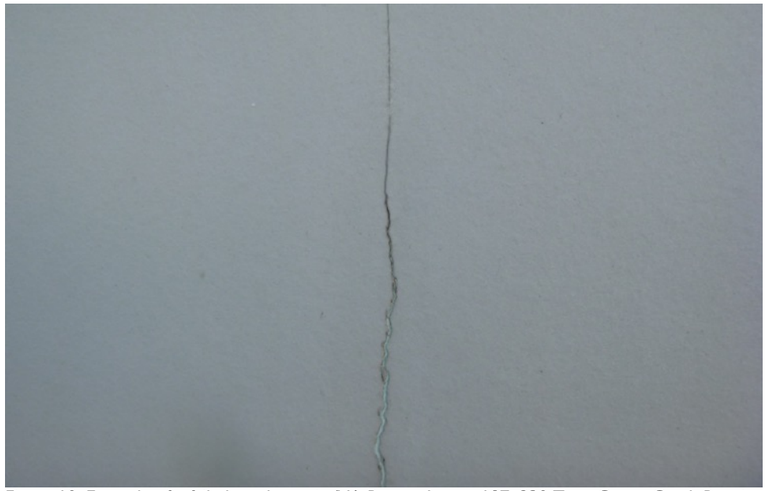

Figure 10. Example of a failed crack repair (VA Report Image: 187_230 TerraCotta_Crack Repair failed 2018_2.jpg)

Spalls

Bonded Spalls *(Figure 11)*

Definition: Piece of material dislodged from a terra cotta unit by excessive stress that appears, based on visual inspection and sounding with a mallet where possible, to be solidly attached to the substrate, typically by means of mortar or adhesive.

The most prolific spall condition documented by VA is bonded spalls. There are 19 occurrences of this type of spall, totaling 881 square inches. Bonded spalls can be found throughout the four elevations, particularly on the balustrades and upper belfry area. VA identified two Priority 1 bonded spalls, both located in the upper belfry section of the northeast elevation. These and other spalls should be addressed to prevent water from entering the structure through the porous clay body of the terra cotta units. If left unchecked these bonded spalls can become hazardous, suddenly become debonded, and fall off the building.

Figure 11. One of the Priority 1-level Bonded Spalls. (VA Report image: 115-258 TerraCotta_Spall Bonded 2018-1.jpg)

Hazardous Spalls

Definition: Piece of material dislodged from a terra cotta unit by excessive stress that is loosely attached and presents an imminent life safety hazard, but which could not be safely removed during the investigation.

There are three conditions labeled by VA as hazardous spalls, all of which are Priority 1. This condition totals approximately 55 square inches. All three spalls are located in the upper belfry section; two 20 square inch spalls on the northwest elevation and one 15 square inch spall on the southwest elevation.

Figure 12. Hazardous spall located on the southwest elevation. (VA Report Image:268-274 TerraCotta_Spall Hazardous 2018-1.jpg)

Incipient Spalls *(Figure 13)*

Definition: Partially formed spall that appears to be well attached.

Incipient spalls are the second most common spall condition found by VA, with 12 locations totaling approximately 223 square inches. These spalls range from 3 to 40 square inches. All incipient spalls are labeled as Priority 2. If left unchecked incipient spalls can become debonded and fall.

Figure 13. Example of an incipient spall (VA Report Image: 25-205 TerraCotta_Spall Incipient 2018-1.jpg)

Missing Spalls *(Figures 14-15)*

Definition: The location of a spall that is no longer in situ at the time of investigation, with no steel evident.

There are 20 instances of spalls that are no longer in situ, totaling approximately 215 square inches. These spalls range in size from two to 30 square inches. These spalls are relatively shallow and do not reveal the hollow cavity of the unit or ferrous metal components. Due to the loss of the protective water repellant glaze, these areas can allow water to seep into the porous clay body of the terra cotta, resulting in future deterioration.

During the survey, VA was able to remove eight incipient spalls, which totals approximately 115 square inches. The result is a missing spall condition. This brings the total number of missing palls to 28.

Figure 14. Examples of spalls resulting in missing fabric and exposing the porous clay body of the unit. (VA Report Image: 33-204 TerraCotta_Spall Missing 2018-1.jpg)

Figure 15. An incipient spall before it was removed by VA. (VA Report Image: 25-203 TerraCotta_Spall Removed 2018-1.jpg)

Surface Loss

Glaze Spalls *(Figure 16)*

Definition: Loss of glaze at the surface of a terra cotta unit, either in discrete spots or wholesale disappearance of glaze, revealing the porous bisque beneath.

Spalling glaze is a widespread condition found on all elevations. VA recorded 87 locations of glaze spalling, totaling approximately 209 square feet. The spire of the upper belfry is particularly affected. Similar to other types of spalling, this condition is caused by water migrating through the porous clay body of the terra cotta. In this case, the water becomes trapped on the interior face of the impervious glaze layer. The glaze stops the water until it builds up enough pressure to pop off portions of the coating. As more of glaze is lost and the clay body of the unit is exposed, water is more likely to be absorbed into the unit, leading to future deterioration such as glaze spalls, cracks, and other types of spalling. Units with significant glaze spalls may need to be replaced. At the very minimum, a field applied glaze coating should be applied to areas of loss.

Figure 16. Example of glaze spalling.

Chipped Areas

Definition: Shallow loss of material, typically at the edges of the terra cotta unit.

VA recorded 24 locations of chipped areas, totaling approximately six square feet. This condition can be found on all elevation. This condition can be caused by water infiltration or the result of impacts to the area by external forces. Similar to glaze spalls, these areas should be treated with a protective coating to reduce water infiltration.

Repairs

Patch Failed Repairs *(Figures 17-18)*

Definition: A previous repair to a terra cotta unit, typically made with cementitious material, that is cracked, separated, loose or otherwise deteriorated.

VA documented 15 locations of failed patches, totaling approximately 91 square inches. The failed repairs range from one to 15 square inches. It appears that different materials were used in these repairs. These failed patches are not only visually dissimilar to the terra cotta but can be a means for water to penetrate the units. The patches may also be compositionally incompatible with the surround terra cotta, resulting in differentially movement and debonded of the patch.

Figure 17. Example of a failed patch repair located on the lower section of the lower observation level. (VA Report Image: 40-193 TerraCotta_Repair Patch Failed 2018-1.jpg)

Joints

Mortar Caulked Failure and Mortar Caulked Joints *(Figure 20)*

Definition: Joints in terra cotta masonry where sealant has been applied over the mortar, and the sealant exhibits cracking, separation, total loss or other signs of deterioration.

The majority of the terra cotta mortar joints have been covered with sealant, and the sealant is in various stages of deterioration. This condition can be found throughout the Campanile, and VA recorded approximately 1163 feet of failing sealant. While on-site BCA noted that the sealant appears to be applied directly on top of the existing mortar, and is about a ¼ of an inch thick.

The joints between the terra cotta units are intended to be filled with a cementitious mortar, composed of sand and a binder mix of lime and Portland cement. The mortar is meant to be the sacrificial component in the cladding system, allowing stresses and water to pass through the joints preserving the more expensive terra cotta units. Introducing an inappropriate material in the joints such as sealant changes this system, making the joints less water permeable. This forces the water to pass through the terra cotta unit, which leads to the various types of deterioration such as glaze loss and rusting of embedded ferrous metal. The sealant over the mortar joints also creates a microenvironment that traps moisture, resulting in staining and biological growth. All sealant over the mortar joints should be removed, and the joints repointed with the appropriate mortar.

Figure 20. Example of a typical joint covered with sealant. Staining and biological growth was present when the sealant was pulled back from joint.

Mortar Failed Joints *(Figure 21)*

Definition: Joints that exhibit eroded, friable, cracked or otherwise deteriorated mortar.

The few areas that still have mortar (that have not been covered with sealant) are failing. Mortar typically has a 25-30 year lifespan. These areas are allowing for water infiltration and will need to be repointed using an appropriate mortar mix. VA recorded approximately 113 feet of failed mortar during their survey.

Figure 21. Example of failed mortar. (VA Report Image:36-237 TerraCotta_Joints Mortar Failed 2018-1.jpg)

Sealant Failed Joints *(Figures 22-23)*

Definition: Joints containing sealant, such as at flashing, in which the sealant exhibits cracking, separation, total loss or other signs of deterioration.

Like the sealant throughout the tower, the sealant along areas of flashing is in varying states of deterioration. BCA also noted that the sealant joints in the bell house appear to be extra wide and have begun to fail. Areas of deteriorated sealant around flashing and elsewhere will need to be replaced to prevent water infiltration.

Figure 22. Area of failed sealant around flasging at the base of spire. (VA Report Images: 190-268 TerraCotta_Joints Sealant Failed 2018-1.jpg)

Figure 23. Example of an extra wide sealant joint in bell house.

Soiling/Stains

Biological Growth *(Figures 24-25)*

Definition

Microbiological plant growth on the surface of masonry, such as algae, moss or lichen, or vascular plant growth, typically in gutters, cracks or on roofs.

Biological growth (such as lichen and moss) are located in various areas, such as over mortar joints and on piles of debris at the corners of the observation decks. The presence of biological growth is an indication that water is collecting in the area for extended periods. Once the water source is removed, the biological growth should stop. Areas with growth over mortar joints should be mechanically removed or chemically treated, and the area repointed with the appropriate mortar. Piles of debris on both observation decks should be removed, and the decks should be routinely swept to keep the area clean and the drains clear.

Figure 24. Biological growth over mortar joint.

Figure 25. Piles of debris with biological growth at a corner on the upper observation level deck.

Copper Staining *(Figure 26)*

Definition: Greenish copper-based stains, typically appearing as streaks below patinated copper elements.

The green copper-alloy staining can be found in various locations on the Campanile. These stains are deposited or washed onto the terra cotta and mortar joints from corroded copper-alloy based elements, such as flashing and anchors. Testing with various types of cleaners will need to be done to determine the best means of removing the staining. Care should be taken to prevent damaging the terra cotta by not to using harsh cleaners or leaving cleaners on the surface for too long.

Figure 26. Example of copper-alloy staining on terra cotta unit.

Leached Salts Encrustations *(Figure 27)*

Definition: Hard encrustations or deposits of salts on the surface of masonry, typically caused by salts leaching out of the mortar or back-up masonry through the effects of moisture.

There are many locations where encrustations of leached salts are visible, particularly at joints and cracks. These deposits form when water containing salts migrates to the exterior face of the unit. When the water evaporates, it leaves the salts behind, and over time the salts accumulate on the surface. These salts can be found in the mortar, backup masonry, or clay body of the terra cotta. VA noted 10 locations with encrustations of salts, totaling approximately 16 square feet.

Figure 27. Example of leaching salts along a joint and face of a terra cotta unit. (VA Report Image: 98-223 TerraCotta_SoilStain Leached Salts 2018-1.jpg)

Rust Staining *(Figures 28-29)*

Definition: Orange brown iron-based stains, typically appearing as streaks below steel or cast iron fasteners or elements.

Rust stains can be found throughout the terra cotta section of the tower. These stains tend to concentrate around joints and cracks, but can also be located on the surface of units. As previously mentioned, the presence of rust is a sign of ferrous metal corrosion from anchors or internal components. Areas with a high level of rust staining should be closely inspected to make sure the affected ferrous metal is in good condition, and not at risk of failure. Much of the staining that is not coming out of cracks or joints appears to be from corroding wires and conduits in the vicinity. Similar to copper-alloy based staining, removing rust stains requires testing different cleaners. VA documented approximately 113 square feet of rust staining.

Figure 28. Rust staining washing down from joint in terra cotta rail above and depositing on the surface of baluster. (VA Report Image: 186-226 TerraCotta_SoilStain Rust 2018-1.jpg)

Figure 29. Rust staining on ornamentation at the upper belfry section. (VA Report Image: 191-268 TerraCotta_SoilStain Rust 2018-1.jpg)

Yellow Staining *(Figure 30)*

BCA observed yellow staining is located in various locations such as the lower balustrade and modillions below the upper belfry section. The exact cause of this staining is unknown but may be the result of using a product containing a high concentration of muriatic acid (also known as hydrochloric acid). Further investigation is required to determine the exact cause.

Figure 30. Example of yellow staining on baluster and pedestal.

Coating

Coating Failed *(Figure 31)*

Definition: Coating on terra cotta that exhibits deterioration such as blistering, peeling, wrinkling, crazing, checking, alligatoring, chalking, staining or discoloration.

It appears that a white coating has been applied to the surface of a few terra cotta units, and in some locations the coating is failing. Other than being unsightly, the coating does not appear to be causing adverse effects to the terra cotta. It was most likely applied to areas of severe glaze failure, or is indicative of a patched area. A closer inspection is required to determine the purpose of the coating and determine if it should be removed.

Figure 31. Example of failing coating on terra cotta unit. (VA Report Image: 34-231 TerraCotta_Coating Coating Failed 2018-1.jpg)

Displacement

Horizontal and Vertical and Horizontal (only) *(Figure 32)*

Definition: Unit(s) shifted out of their as-built position in either the horizontal (left/right or forward/back) direction or both a horizontal and vertical (up/down) direction.

During the survey, VA identified 18 locations of horizontal and vertical displacement and one location of horizontal (only) displacement. This displacement may be due to rust jacking of the internal ferrous metal structure, or movement of the tower. Probing may be necessary to determine the extent of deterioration.

Figure 32. Example of horizontal and vertical displacement located in the lower belfry section on the southeast elevation. (VA Report Image: 27-243 TerraCotta_Displacement Horizontal 2018-1.jpg)

Other

Sheet Metal (Flashing) *(Figures 33-35)*

There are many locations where the soldered seams of the copper-alloy sheet metal flashing have failed or are in poor condition. These failed seams allow for water infiltration that can lead to deterioration. VA documented 31 locations of solder failure, totaling approximately 24 feet. Other conditions noted were coating failure and damaged material (punctures and tears). Areas with punctures and tears should be repaired to prevent water infiltration. BCA noted that some of the flashing in the bell house has some damage (bends, tears, and punctures) that should also be addressed.

Figure 33. Solder failure in flashing. (VA Report Image: 24-222 SheetMetal_Seam Solder Failed 2018-1.jpg)

Figure 34. Punctured flashing. (VA Report Image: 36-235 SheetMetal_Damaged Punctured 2018-1.jpg)

Figure 35. Torn flashing. (VA Report Image:44-204 SheetMetal_Damaged Torn 2018-1.jpg)

Holes *(Figures 36-37)*

BCA observed a number of locations where holes have been drilled into units in the lower observation level and above the doors at the upper observation level. Currently, these holes are open, exposing the porous clay body of the terra cotta to water infiltration. These holes should be filled to prevent future deterioration.

Figure 36. Example of holes in terra cotta at the lower observation level.

Figure 37. Holes in terra cotta above the metal door at the upper observation level.

Metal Doors

The doors located at the observation decks appear to be in good condition, except for some peeling paint on the exterior face. The areas with deteriorating paint should be removed and the surface repainted.

Metal grates (architectural metal), bell supports (architectural metal), wires, and conduits. *(Figures 38-39)*

The metal grates and their supports at the balconies are corroding and need to be removed. If new grates are required for safety reasons, replacements should be made of stainless steel or aluminum. The architectural metal in the bell house (bell supports and ladder) is in varying states of coating deterioration, with corrosion and damage also present. Many terra cotta units that intersect with the bell supports have cracked. This is an indication that the section of metal inside the wall has corroded. A probe may be necessary to assess the amount of deterioration that has taken place.

There are also numerous wires, conduits, and string lights attached to the mortar joints located throughout the terra cotta portion of the Campanile. Most of these elements appear to be abandoned and severely deteriorated. Items that are not in use should be removed. Objects that are needed should either be replaced or coated with a rust-inhibiting paint, preferably matching the color of the terra cotta.

Figure 38. Corroded ferrous metal grates attached to lower level balcony balustrade.

Figure 39. Corroded bell support near cracked terra cotta.

Surface of Observation Decks and Drains *(Figure 40)*

The floor surface of both observation decks is in poor condition and should be recoated in the near future. There is a large amount of debris on the decks that should be removed. On the upper observation deck, debris had clogged the drain resulting in a couple of inches of standing water.

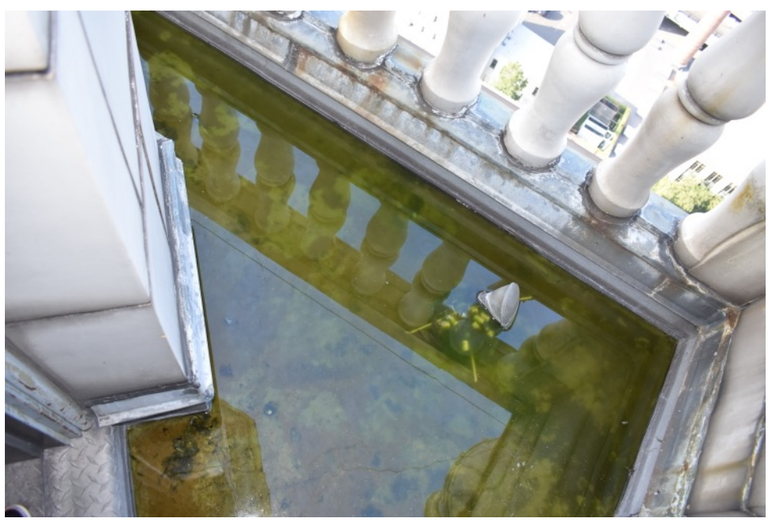

Figure 40. Standing water on the upper observation deck.

Interior Brick *(Figure 41)*

The brick located on the interior of the terra cotta section of the Campanile appears to be in good condition. BCA did not find any major cracks or spalls. However, there are areas of copper staining and encrustations of leached salts in the bell house. The salts appear to be coming from areas with flashing where the terra cotta and brick meet. The copper staining is more widespread.

Figure 41. Area of leached salts and copper staining on bricks.

TREATMENT RECOMMENDATIONS

As noted above, municipal records indicate that the majority of the terra cotta was replaced during the 1967 tower reconstruction project. Given the height, exposure, and location of the Campanile and that the existing terra cotta is not original material it is recommended that damaged units be replaced wholescale, unless in a location that would involve disassembly of large quantities of sound units to access and remove.

Damaged Terra Cotta Units

Significantly cracked, displaced, and previously repaired units noted during the Vertical Access survey should be removed and replaced with new units, matching the removed units in shape, configuration, color, texture, and reflectance. While replacement in kind (with terra cotta) is recommended, there are also alternative replacement materials, discussed in the "Discussion of Replacement Materials" section below. It is possible that some cracked units where both sides of the crack are securely bonded to the backup masonry could be repaired with a composite patching mortar. Units that would be acceptable to repair in place could not be determined from the scope of Vertical Access' survey. Repairs would need to be developed after up-close hands-on inspection during construction and would be limited to the ashlar fields of the building, not the exposed spire or balustrade elements.

Units with major spalls or large incipient spalls should also be removed and replaced. Units with shallow spalls that do not reveal the hollow cavity of the unit or ferrous metal components (the majority of the "Missing Spalls" category discussed above) can be repaired with composite patching material. Similarly previously patched areas in the "Patch Failed Repairs" category can be re-patched. Patching of very shallow surface spalls is not recommended as these patches cannot be properly prepared without further damage to the underlying material.

Other units with failures called out in the Vertical Access report that do not require replacement with new units include units with crazing, surface loss, and units with glaze spalls that are otherwise sound. In the case of these units it is recommended that all loose or deteriorated coating be removed. Once loose material is removed the units should be coated with vapor permeable coating to replace the missing and damaged glaze.

Joints

As documented by Vertical Access, joints between units appear to be filled mortar covered with sealant throughout the terra cotta areas of the building, presumably installed in this way during the 1966 reconstruction. The sealant is failed throughout the Campanile. Failed sealant should be removed at all joints and the joints raked out to allow for the installation of new mortar. It is not recommended to re-seal the joints, as sealant does not allow for water vapor transmission through the joints and instead directs it through the terra cotta. The widespread glaze failures observed at the terra cotta may be related to the existing sealed joints. The few joints that are not sealed at the building should also be raked out and repointed.

Cleaning

The terra cotta should be cleaned prior to the commencement of the repair work. The cleaning process should include testing to determine appropriate cleaners to remove general soiling from the surface of the units without damaging the units themselves. Copper and rust staining should be removed with specialty cleaners, also determined through testing.

Other Recommendations

The roof deck surface coating is deteriorated. Loose coating should be removed and the concrete re-coated with a new liquid-applied waterproofing membrane to prevent water entry into the concrete (and terra cotta) below. As part of this work the drains should be replaced and drain lines inspected and made functional.

The metal grates installed at the interior side of the balustrades are significantly rusted and are beginning to damage the surrounding terra cotta through rust jacking at the anchors and rust staining of the masonry. These grates should be removed. If new grates need to be installed then the replacement material should be made of either stainless steel or other weather-resistant material. Similarly, lighting conduit and wires present at the building are significantly deteriorated and should be replaced with more weather-resistant materials. Any conduit or wire no longer needed should be removed from the Campanile.

All doors at the Campanile should be replaced with new doors.

DESCRIPTION OF REPLACEMENT MATERIALS

The belfry and observation levels of the Campanile are constructed of terra cotta. According to municipal records the terra cotta at the Campanile is a replacement material installed in 1966. By the 1950s and 1960s the use of architectural terra cotta had become less common, making this replacement material somewhat unusual for the time. Per newspaper accounts from the mid-1960s, the replacement terra cotta for the Campanile was provided by Federal Seaboard Terra Cotta Co. out of Perth Amboy, New Jersey. The drawings for the restoration project show detailing and anchoring information similar to traditional terra cotta. It is recommended that some sample units be removed to verify if they share the same properties as traditional terra cotta.

Below is a description of alternative materials that can be used instead of traditional terra cotta for replacing missing or deteriorated elements. The replacement work on the belfry and observation levels will include replacement of individual units as well as replacement of large areas of spanning multiple units. The visual match to the existing, physical compatibility with surrounding terra cotta, lifespan and relative cost will all factor into the decision about what material to use. Due to the height and inaccessibility of the terra cotta elements, long-term repairs should be considered. We strongly recommend factoring in life cycle costs, not just initial cost, when deciding on a replacement material. The quality of the product produced should be closely monitored because poor quality materials will have a much shorter life span than projected.

Terra Cotta

Terra cotta is a glazed clay product fired at very high temperatures, resulting in a relatively stable clay body and water impermeable surface. The material is also brittle and subject to cracking and spalling with building movement and expansion of underlying rusting iron fasteners. New units will share the same material properties, weight, glaze characteristics, weathering properties, and configuration as the surrounding material and replacement units may be able to be attached to the existing supports using similar anchorage mechanisms. Replacement units are created from molds of existing units that are then re-sized to allow for clay shrinkage when the units are fired. The same level of detail is possible in the replacement unit that is present in the existing units. New glazed terra cotta will provide the closest visual – color, texture and reflectance - match to the existing terra cotta. Using terra cotta provides the greatest chance of physical compatibility between the new and existing material.

The preferred replacement material is in kind with new terra cotta units. This is likely the highest cost option, and the longest projected lifespan at 50-100 years. The longevity of terra cotta, as with most of the replacement material described, relies on maintenance of the mortar joints to keep water out of the system.

Pre-Cast Concrete/Cast Stone

Precast concrete and cast stone are composed of cement, aggregate and sand, with pigments for color and additives such as air entrainers and water reducing agents to improve performance of the material over time. Precast and cast stone share some of the physical properties of terra cotta and can be designed to be installed using similar methods, allowing existing backup to be used. The units will have to be carefully incorporated into the wall to allow for different rates of thermal expansion and contraction. Concrete is load-bearing and is typically heavier than terra cotta so care needs to be taken when units are installed within existing terra cotta fields. Pieces are typically cast from molds of the original units and can replicate architectural details, although not with the high level of detail possible with terra cotta. Color and surface reflectance as well as differential weathering are issues with using concrete in lieu of terra cotta, as the concrete units are not fired and do not have a glazed surface. The concrete itself is pigmented to achieve the color rather than having an applied glaze. The Campanile's existing terra cotta glaze is relatively uniform in color, so a close color match can probably be achieved, but the surface reflectance will be noticeably different.

Concrete units are more absorptive than terra cotta, and are subject to more surface weathering, resulting in a shorter lifespan of 25-35 years. This option is less expensive than terra cotta, but still requires substantial custom work. This is the second recommendation for replacement.

GFRC

Glass fiber reinforced concrete is composed of sand, cement, acrylic polymer, water, and glass fibers to create a lightweight alternative to terra cotta. It is typically used to create thin panels and shapes for large areas of wall surface or decorative cornice and balustrade elements. It is not typically formed as individual separate units, so it is not a good alternative for individual unit replacement. The material is non-load-bearing and attaches to a separately designed and

installed armature. Color in GFRC is produced through the overall color of the matrix rather than with a glaze. The color tends not to be stable and the surface color fades over time. GFRC has a much higher rate of thermal expansion than terra cotta, so it is not recommended for use within an existing terra cotta wall system, but could be used if a separate area of terra cotta is replaced 100%.

GFRP and GFRC are the lowest cost options, and also the materials with the shortest projected life span at 20-25 years.

GFRP

Glass Fiber Reinforced Polymer (also known as fiberglass) was developed in the 1930s and has been used as an architectural material since the 1960s. It is a thin shell material composed of polyester or epoxy resin with glass-fiber fabric. GFRP has often been used to replace terra cotta, particularly in balustrade and cornice applications. Similar to GFRC, it can be panelized but should not be used as individual replacement units within a terra cotta system due to differential thermal expansion. GFRP often requires a different anchoring system than terra cotta. Original units are used to create molds, and a high level of detail can be achieved in the replacement units. The replication of color can be an issue as it is more uniform than many of the terra cotta glazes on existing buildings. Color comes from a gel coating applied over the plastic matrix. Also, the gel coating can fade and chalk with UV exposure changing the color of the replacement units.

GFRP and GFRC are the lowest cost options, and also the materials with the shortest projected life span at 20-25 years.

Microcotta

Microcotta is a material made of a proprietary polymer-resin blend developed in the 1980s. It is lighter than precast concrete and many GFRC mixes. Like GFRP original units are used to make molds and ornamental detailing can be easily reproduced. Unlike GFRP it appears that it can be made into solid blocks allowing it to be installed similarly to precast concrete, although it is non-load-bearing and its thermal expansion compatibility with terra cotta is not well studied. Color and reflectance can be matched, and the product claims it is UV stable and retains its color over time. There is no testing data available to be able to assess the durability or lifespan of the product. Anecdotally we have heard that it is approximately 2/3 of the cost of terra cotta. With so much unknown about the material, it is difficult to recommend it as a replacement material.

Plaza Waterproofing and Limestone Restoration

Simpson Gumpertz & Heger, Inc.

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Project Team:

Matthew Bronski PE
Helena Currie PE

- Elevated Plaza Paving and Waterproofing Investigation and Schematic Design
- Limestone Cladding Investigation
- Limestone Repair Options

SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

1 July 2019
(Revised 16 September 2019)

Mr. Ken Guditz
Bruner/Cott Architects
225 Friend Street
Suite 701
Boston, MA 02114

Project 181599 – Elevated Plaza Paving and Waterproofing Investigation and Schematic Design, Springfield Campanile, 36 Court Street, Springfield, MA

Dear Mr. Guditz:

Per your request, Simpson Gumpertz & Heger Inc. (SGH) completed an investigation and condition assessment of the elevated plaza paving waterproofing assembly (plaza) at the Springfield Campanile. This letter summarizes our findings and provides narratives for concept-level rehabilitation of the plaza.

1. BACKGROUND

We understand from conversations with you that the City of Springfield reports recurring leakage beneath the plaza at Springfield Campanile despite various attempts to identify and repair potential leakage paths.

Based on our review of Drawing Number A-1 of reconstruction drawings by Hoyle, Doran and Berry Architects (HDBA), dated 15 February 1966 (Figure 1), the following rehabilitation work was indicated at the plaza:

- The “walking surface and fill” was to be replaced with “new fill and composition floor and base” that would cover some of the existing steps.
- New metal flashing was to be reglet-set in base of balustrade and building face.

We do not know whether this work was completed, or whether additional work occurred after this 1966 rehabilitation. The HDBA drawings also indicates a total of four drains in the plaza surface, located near the midpoints of both balustrades on both sides of the tower.

Given the limited information on the existing plaza and reports of ongoing leakage, our overall objective for assessment was to determine the existing composition and condition of the plaza assembly, with particular regard to potential leakage paths and any inherent shortcomings of the existing plaza assembly. Our assessment primarily consists of visual review of the plaza and representative exploratory openings in the plaza assembly at the Springfield Campanile. Roughly concurrent with our review, Robert Silman Associates (Silman) performed a structural review of the structural concrete slab at the plaza.

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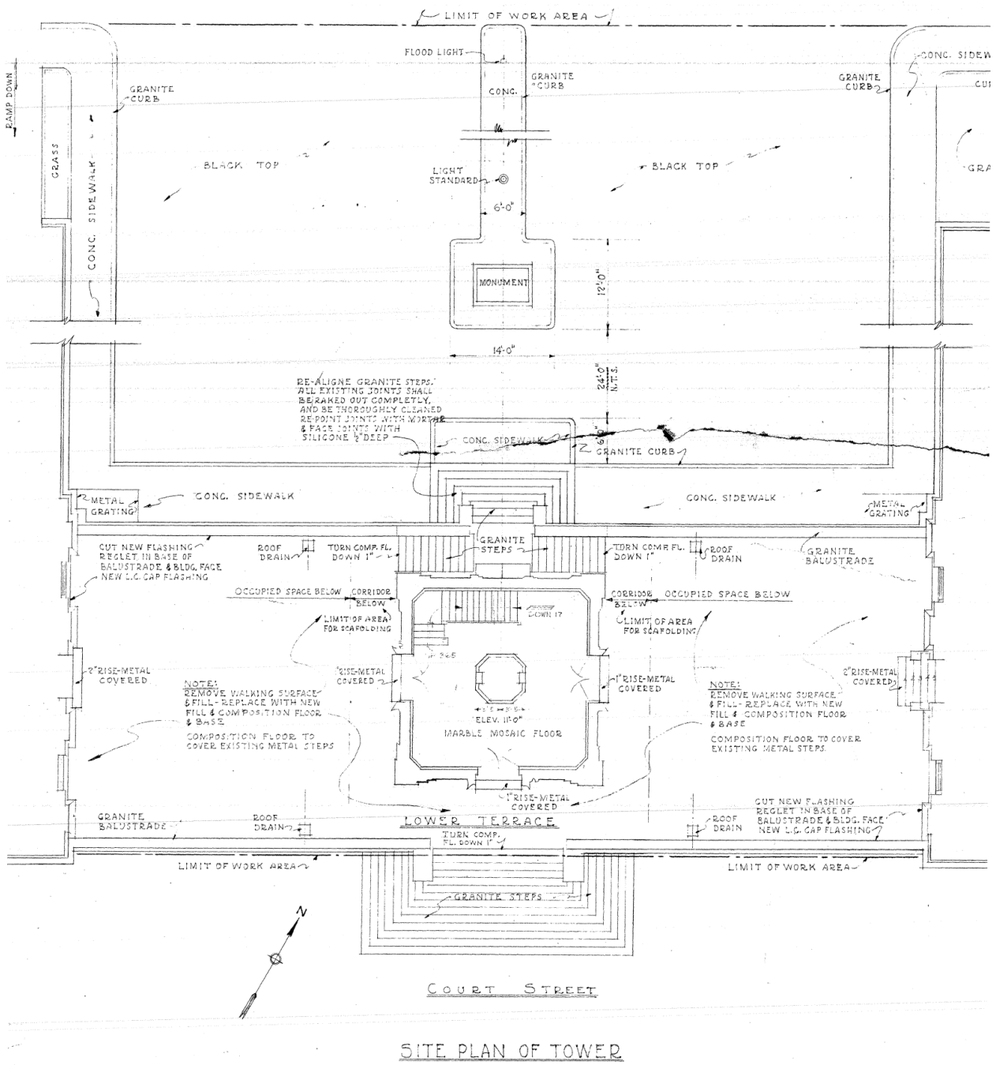

Figure 1 – Drawing Number A-1 of the Plaza Reconstruction Drawings by Hoyle, Doran and Berry Architects (HDBA), Dated 15 February 1966

2. VISUAL OBSERVATIONS

2.1 Interior Survey

The plaza at the base of the tower consists of a one-way ribbed concrete slab that is partially exposed at the interior where portions of the ceiling are removed (Photos 1 and 2). Where the

underside of the plaza structure is exposed (e.g., in the mechanical room), we observed the following:

- Several longitudinal cracks with dark staining at the underside of the concrete slab, between the ribs.
- Steel supports for the plaster ceiling and the metal lath that are corroded (Photo 2).

Where interior finishes are still intact, we observed water staining and peeling paint throughout the spaces below the plaza (Photo 3). Building staff reports that leakage in these areas has been an ongoing issue for years.

Silman will provided Structural review of the structural concrete slab at the plaza under separate cover.

2.2 Exterior Survey and Review of Exploratory Openings

On 22 April 2019, Benjamin M. Lueck of SGH reviewed four exploratory openings in the topside of the plaza. SGH selected the exploratory opening locations to represent a range of conditions and to determine the composition, thickness, and condition of the various plaza components, as indicated in Figure 2 below.

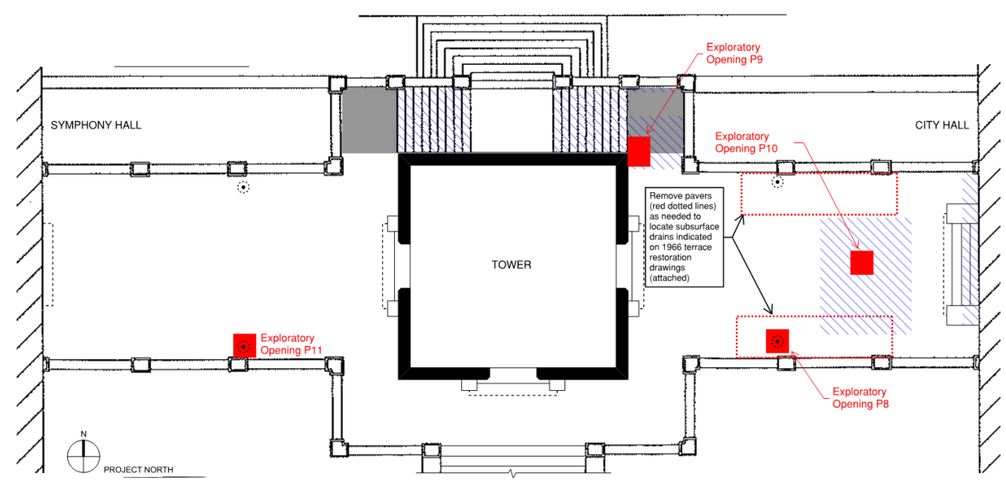

Figure 2 – Annotated Plan of the Plaza, Indicating the Approximate Locations of Exploratory Openings Included in Our Visual Condition Assessment

2.2.1 Existing Plaza Construction

Based on our review of the four exploratory openings, the plaza assembly generally consists of the following, from top to bottom (Figure 3):

- **Pavers:** Precast pavers measuring 1-3/4 in. thick by about 24 sq in. set on approximately 1/2 in. tall plastic pedestals. The topside of the pavers is visibly sloped towards the drains at both sides of the tower.

- **Waterproofing Layer #1:** The existing uppermost waterproofing at the plaza slab consists of an adhered yellow/tan base layer, which appears to be reinforced, fluid-applied waterproofing with a black granulated surfacing (Photo 1).

  Waterproofing Layer #1 typically extends up the first riser of the tower stairs and the base of pilasters, where it is self-terminated (Photo 4). Elsewhere, the termination for Waterproofing Layer #1 is concealed by a sheet metal counterflashing installed in a reglet-set into the limestone at the building facades and balustrades (Photo 5). The vertical leg of the counterflashing is typically 3 in. long, with the top of the counterflashing 3 to 5 in. above the surface of Waterproofing Layer #1.

- **Topping Slab #1:** The concrete slab below Waterproofing Layer #1 varies in thickness from 4-3/8 in. at Exploratory Opening P10 to 4 in. at Exploratory Openings P8 and P11. Topping Slab #1 does not appear to be part of the original plaza assembly because it partially conceals the lowest step at the entrances to the tower, which is visible in a 1914 *Architecture* photo of the plaza (Photo 6). Smooth welded-wire mesh is embedded in the bottom 1 in. of Topping Slab #1.

  Based on the 3/8 in. change in thickness between Exploratory Openings P8 and P10, which are about 20 ft apart, Topping Slab #1 is not significantly sloped to drain.

- **Intermediate Layer:** Under Topping Slab #1, remnants of a black mastic or coating are visible on top of another layer of concrete topping (Photo 7). Because this layer is beneath Topping Slab #1 and because there is no black coating exposed at the topside of the plaza in the 1914 *Architecture* photo (Photo 6), it is unlikely that the intermediate layer is part of the original plaza assembly.

- **Topping Slab #2 (presumed to be original based on 1914 *Architecture* photo, Photo 6):** We measured the second layer of concrete topping to be about 7 in. thick at Exploratory Opening P10. We did not instruct the contractor to excavate through this topping slab at Exploratory Openings P8 or P11 and thus we do not know whether this layer is sloped to drain. The color and composition of Topping Slab #2 appears to be different than that of Topping Slab #1 (i.e., darker with more coarse aggregate), indicating it is a different cementitious mix.

- **Waterproofing Layer #2 (presumed to be original based on 1914 *Architecture* photo, Photo 6):** At Exploratory Opening P10, where we instructed the contractor to core through the full thickness of the plaza assembly and structural concrete deck, we observed that Waterproofing Layer #1 consists of a black material that appears to be a bituminous waterproofing material (Photo 8).

- **Structural Slab (presumed to be original based on 1914 *Architecture* photo, Photo 6):**The structural slab is 3 in. deep (between ribs) at Exploratory Opening P10, with ribs as indicated in Figure 1 below. We did not observe the presence of steel reinforcement at the core location.

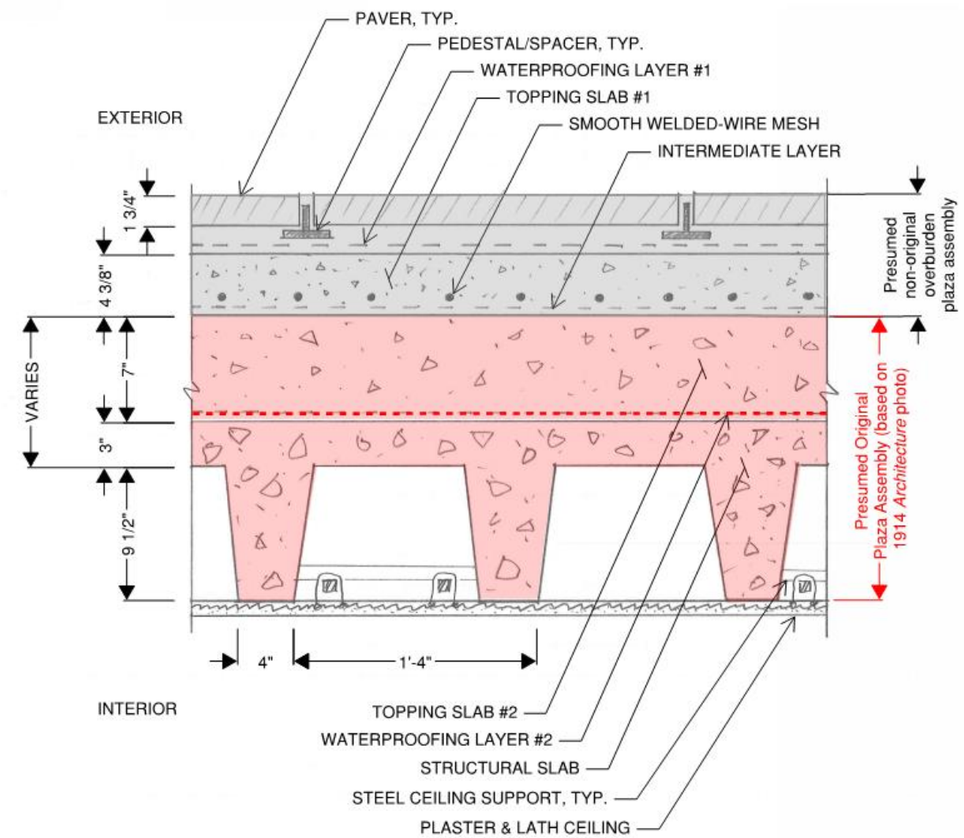

Figure 3 – Existing Section of Plaza Assembly at Campanile

The composition of the typical existing waterproofing assembly described above appears to constitute at least one and possibly two remedial waterproofing and paving systems installed atop the original system, creating an accumulation of layers and systems.

At the exploratory openings, we observed that they filled with water over time, although we were not certain whether the water filling the exploratory opening holes was:

- Water trapped within the plaza assembly that slowly leached through the layers beneath the uppermost Waterproofing Layer #1,

- Water from wet cores, wet saws, and other wet tools,

- Water from leaks through the temporary waterproofing patch at the surface of the exploratory opening, or
- Some combination of the above.

The composition of the plaza assembly at Exploratory Opening P9 differs from the other openings in that Topping Slab #1 and Topping Slab #2 are only about 2 in. and 1-1/2 in. thick, respectively. Additionally, Waterproofing Layer #2 appears to be installed on top of a masonry wall at Exploratory Opening P9, rather than the topside of the structural deck.

While the existing surface of the plaza is visibly sloped to drain, there does not appear to be a consistent slope at any given layer of the plaza assembly (but rather, each layer is slightly pitched to provide a net slope to drain at the topside of the pavers). Our rough estimate for the overall slope from the buildings to the drains at the topside of the pavers is approximately 1/8 in. per foot.

2.2.2 Existing Plaza Condition

The plaza exhibits the following signs of widespread leakage:

- Waterproofing Layer #1 is generally not well adhered to Topping Slab #1.
- Intermediate and Waterproofing Layer #2 do not appear to be intact (i.e., only remnants remain).
- Topping Slab #1 is reportedly soft and easy to remove.
- The underside of the structural concrete deck is cracked and stained.
- Interior finishes are damaged and supporting steel framing is corroded.

Additionally, the plaza is not well-sloped to drain at any of the various waterproofing layers and base flashing heights are typically less than 8 in. from the top of Waterproofing Layer #1. A brief description of each plaza assembly component is provided below:

- **Pavers:** Organic growth is present between pavers and between perimeter pavers and the base flashing. Pavers are not typically cracked, spalled, or deteriorated.
- **Waterproofing Layer #1:** This layer of waterproofing is typically unadhered where it self-terminates (e.g., at the stairs to the tower) (Photo 4). Additionally, we observed that this layer or waterproofing is typically unadhered on horizontal surface, with signs of moisture and staining at the underside of the membrane after it is peeled back.
- **Topping Slab #1:** While we observed no obvious staining or cracking in the topping slab, the contractor informed us that Topping Slab #1 was relatively easy to remove.
- **Intermediate Layer:** Only remnants of this layer remain. Observations are limited since this layer was only exposed at one of the four exploratory openings.
- **Topping Slab #2:** This topping slab does not appear to be well-sloped to drain.

- **Waterproofing Layer #2:** Only remnants of this layer remain. Observations are limited since this layer was only exposed at one of the four exploratory openings.
- **Structural Slab:** The structural concrete slab does not appear to be well-sloped to drain and exhibits numerous cracks, stains, spalls, etc., at the underside.

Where sheet metal flashing is present, we observed several locations where the sealant is failed at reglet-set terminations. The drains visible at the top surface of the plaza appear to be single-level drains and are corroded. Waterproofing Layer #1 is loosely laid into the drain bowl.

3. DISCUSSION

3.1 Existing Construction of Elevated Plaza Waterproofing Assembly

The 4-1/2 in. difference in topside paver elevation now and in 1914 indicates that Waterproofing Layer #1 and Topping Slab #1 are not original to the plaza assembly. Based on the thickness of Topping Slab #1, it likely that the top surface of Topping Slab #2 – if not original material – is located at the same elevation and sloped to match the original plaza surface. Additionally, National Park Service Preservation Brief 15, *Preservation of Historic Concrete*, states that “cinder from burned coal or crushed brick,” which is present in Topping Slab #2, was commonly used as aggregate in some concrete structures built prior to World War I, suggesting that Topping Slab #2 and Waterproofing Layer #2 may be part of an original split-slab assembly. This further suggests that the intermediate waterproofing layer (of which only remnants remain), Topping Slab #1, Waterproofing Layer #1, and the current pedestal paver system are all nonoriginal layers installed atop the original system.

From a historical and technical perspective, it is advantageous to restore the plaza assembly to its original thickness relative to regain the lower step at tower entrances and increase base flashing heights at the perimeter of the plaza. Additionally, removing the various waterproofing and topping slab layers will provide an opportunity for reducing the overburden weight on the structural slab, and also provides greater opportunity to improve the slope to drain at the membrane level.

Silman will provide structural review of the structural concrete slab at the plaza under separate cover.

3.2 Existing Condition of Elevated Plaza Waterproofing Assembly

The existing plaza assembly is beyond its useful life for the following key reasons:

- Loss of bond between Waterproofing Layer #1 and Topping Slab #2.
- Unadhered sky-facing terminations of Waterproofing Layer #1.
- Presence of multiple waterproofing layers and overburden, which allows water to migrate horizontally through topping slab layers.
- Lack of drainage plane, protection layer, and adequate drains at the membrane level.
- Signs of widespread leakage at the interior.

4. RECOMMENDATIONS AND CONCEPTUAL DESIGN ALTERNATIVES

We recommend complete removal of the existing plaza assembly down to the topside of the ribbed structural concrete slab. Removal of the approximately 11 in. of topping slabs will improve base flashing heights, increase slope to drain, and reduce the overburden on the existing structural deck.

We recommend the owner enlist an environmental specialist to determine whether any portions of the existing plaza assembly contain hazardous materials that require specific removal or disposal processes. We are happy to provide samples of the various plaza assembly components from our exploratory work upon request.

Given the current issues with water migration through interstitial layers of an adhered waterproofing system and the cold climate of the Campanile, we recommend replacing the existing paving and plaza assembly with a new system consisting of the following, from bottom to top:

- Existing structural concrete deck, rehabilitated as recommended by Silman.
- Sloped concrete topping, with slope of 1/4 in. per foot to new cast iron drains.
- Waterproofing membrane consisting of a robust, durable plaza waterproofing system with a track record of success, such as:
  - Fully adhered, reinforced, fluid-applied waterproofing, such as PMMA (e.g., Kemper Waterproofing Systems).
  - Fully adhered, fabric reinforced, hot-applied rubber waterproofing (e.g., American Hydrotech).
  - Gridded, reinforced PVC membrane waterproofing (e.g., Sarnafil).
- Continuous protection layer.
- Continuous drainage space.
- High-density, closed-cell, rigid insulation board (e.g., Dow “Plazamate XPS Insulation”).
- Pedestal system.
- Open-joint loose-laid natural stone or precast concrete pedestal pavers.

We recommend mockups of the system and water testing of all membrane prior to the installation of any overburden layers.

Sincerely yours,

Matthew B. Bronski, P.E.
Principal
MA License No. 52573

Helena M. Currie, P.E.
Senior Consulting Engineer
MA License No. 51947

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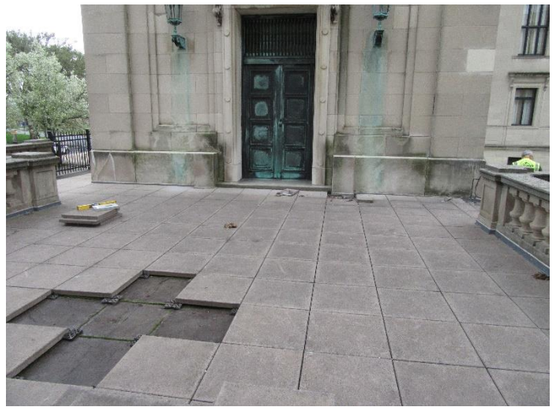

Photo 1

Overview of the topside of the plaza at Springfield Campanile. Note area at bottom left of photo where Waterproofing Layer #1 is exposed and a black granulated top coat is visible.

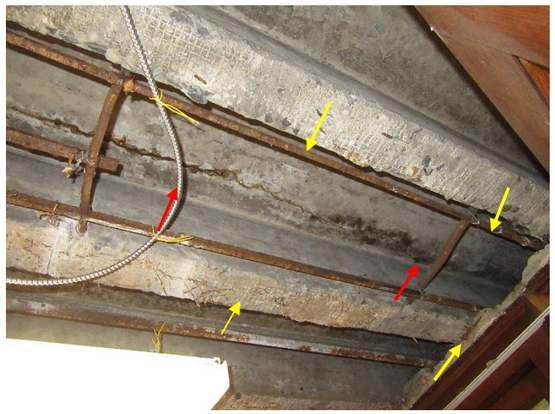

Photo 2

Representative photo of the one-way concrete slab at the underside of the plaza, which is exposed in areas where the ceiling is removed. Cracks with dark staining (red arrows) are present at the underside of the concrete slab between the one-way ribs. Steel supports for the plaster ceiling metal lath are corroded (yellow arrows).

Photo 3

Representative photo of water staining and damage at interior finishes below the plaza.

Photo 4

Waterproofing Layer #1 self-terminates (red arrow) at the tower and building stair risers, and is typically not well adhered.

Photo 5

Waterproofing Layer #1 is concealed by a sheet metal counterflashing (red arrow) installed in a reglet-set with sealant into the limestone at the building facades and balustrades.

Photo 6

Comparison of topside paver elevation (left image is from 1914 *Architecture* photo, right image taken by SGH on 22 April 2019). Note that two steps at the tower are visible in the image on the left (red arrows), while only one short step is visible in the image on the right (red arrow). Note also the topside of the plaza appears to be concrete, with no obvious joints.

SGH Project 181599 / July 2019
(Revised 16 September 2019)

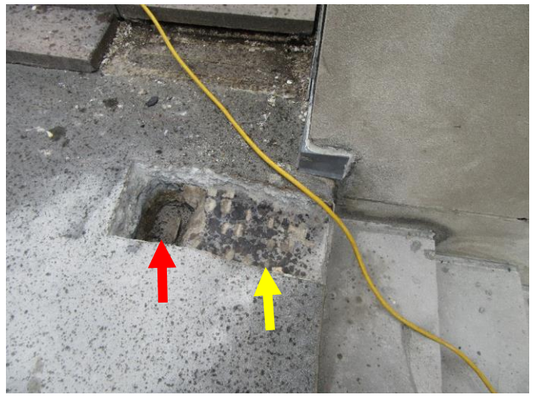

Photo 7

Exploratory Opening P9, where Waterproofing Layer #1 and Topping Slab #1 are removed, and an intermediate membrane is visible (yellow arrow). Note that removal of Topping Slab #2 exposes Waterproofing Layer #2 (red arrow).

Photo 8

Waterproofing Layer #2 visible at the core taken through the full thickness of the plaza assembly and structural deck at Exploratory Opening P10.

Photo 9

Core through the plaza assembly and structural slab (indicated in red) at Exploratory Opening P10.

SIMPSON GUMPERTZ & HEGER

Engineering of Structures
and Building Enclosures

15 July 2019
(Revised 23 September 2019)

Mr. Ken Guditz
Bruner/Cott Architects
225 Friend Street, Suite 701
Boston, MA 02114

Project 181599 – Limestone Cladding Investigation, Springfield Campanile, 36 Court Street, Springfield, MA

Dear Mr. Guditz:

Per your request, Simpson Gumpertz & Heger Inc. (SGH) conducted an investigation of the limestone cladding on the composite masonry walls of the Springfield Campanile. The attached report summarizes our findings, outlines and compares the relative advantages and disadvantages of various concept-level rehabilitation options, and provides our recommendation.

Please let us know if you have any questions or concerns.

Sincerely yours,

Matthew B. Bronski, P.E.
Principal
MA License No. 52573

Helena M. Currie, P.E.
Senior Consulting Engineer
MA License No. 51947

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APPENDIX

APPENDIX A – Exterior Limestone Probe Layout Plan

1. BACKGROUND

The Campanile is a freestanding tower, approximately 300 ft high, that was constructed between 1910 and 1912 in the Beaux Arts style in downtown Springfield, Massachusetts (Photo 1). The Campanile is at the center of the Municipal Group, planned and constructed as an ensemble, that includes Symphony Hall to the southwest of the Campanile, City Hall to the northeast of the Campanile, and a plaza at the base of the tower, elevated above Court Street, with a formal procession of steps leading from Court Street to the elevated plaza and the entrance to the Campanile. Throughout this report, “Campanile” is used to refer to the freestanding tower. The plaza at the base of the Campanile is the subject of a separate report already issued by SGH.

The Campanile is generally constructed with a braced steel frame and a masonry wall built integrally around the steel frame. The masonry wall generally consists of brick masonry backup, with ashlar-cut limestone cladding for the outer wythe over most of the tower, except with glazed terra cotta cladding in lieu of the limestone at the upper portion of the tower. More detailed descriptions and drawings of the tower construction are included in other documents already produced by Bruner/Cott (BCA) and their team.

This report is part of a larger assessment of the Campanile by the team that includes the following:

- Development of accurate drawings of the Campanile through laser scanning.
- An exterior condition assessment of all exposed masonry (limestone and terra cotta cladding) by Vertical Access (VA).
- An existing condition report on the structure of the Campanile, including both the masonry walls and the encased steel framing, by Robert Silman Associates (Silman).

2. OBJECTIVE

The overall objective for our limestone cladding investigation was to investigate the underlying causes of the distress (e.g., spalling and cracking) in the limestone cladding, through exploratory openings (probes), to inform our team's development of options for the rehabilitation of the Campanile.

3. DOCUMENT REVIEW

We conducted a preliminary review of the following documents that BCA provided:

- *Springfield Campanile – Existing Conditions Structural Probes,* report by Robert Silman Associates (Silman), dated 13 June 2019.
- *Condition Survey Report,* by Vertical Access (VA), dated 16 November 2018.
- *Restoration of the Campanile Tower* (excerpts), by Stopfel Inc. Architects, dated July 1999, including narrative descriptions of the existing construction and conditions.
- Various newspaper clippings and historical photos provided by Bruner/Cott Associates (BCA).
- Four sheets of original drawings by Pell and Corbett Architects (PCA), dated 19 – 24 November 1909, including various tower elevations, sections, and plans.
- One sheet of reconstruction drawings by Hoyle, Doran and Berry Architects (HDBA), dated 15 February 1966, including tower and plaza plans.

Based on Sheet T2 of the 1909 PCA Drawings, we understand that the exterior walls of the tower are tapered and consist of steel framing encased in brick and mortar (refer to Silman report for description of structural steel framing). Scaling from the tower sections, the brick masonry likely consists of three wythes thick near the base of the tower, with a fourth variable-thickness outer wythe of limestone.

From the base of the tower to the lower observation deck, the cladding consists of ashlar limestone units. Above this level, the exterior masonry consists of brick and terra cotta, which was constructed circa 1960 during a major rehabilitation of the upper portion of the tower (approximately one-third of the total height).

Elevations on Sheet T1 of the PCA drawings indicate the steel framing consists of columns at each of the tower corners and horizontal spandrel beams at floor lines. An intermediate spandrel beam is indicated at the approximate midpoint between floor lines and is connected to cross-bracing. The original drawings do not indicate how the limestone masonry is attached to the brick-encased steel framing.

4. OBSERVATIONS

4.1 Pre-Investigation Walkthrough and Planning

On 20 February 2019, Matthew B. Bronski and Helena M. Currie of SGH met with Ken Guditz of BCA and a representative of Summit Masonry and Building Restoration (Summit) on site to conduct a preliminary walkthrough of the tower to collectively brainstorm our planning and approach to our limestone cladding investigation, including lift access, contractor assistance, and shared probes with Silman's structural investigation. This walkthrough included our visual review of preexisting probes in the interior face of the brick masonry backup walls with exposed structural steel framing, as well as a general review of the interior face of the brick masonry backup, and the exterior limestone as viewed from the ground.

In general, we observed the following at the interior face of the brick masonry backup walls:

- Some of the interior face of the brick masonry is painted while some is not.
- The interior face of the brick masonry generally exhibits little to no indications of deterioration (e.g., cracking, spalling, bulging, etc.) or moisture-related distress (e.g., staining, efflorescence, surface scaling, etc.). One notable exception is at the northeast wall of the Campanile (the wall towards City Hall); at approximately 110 ft high, the interior face of the brick masonry is bulged inward along a horizontal line that roughly aligns with a large horizontal crack at the exterior bed joint of the limestone cladding, and that also appears to align with an encased steel spandrel beam.

At the preexisting interior probes, we observed the following (Photo 2 and Fig. 1):

- The spandrel beam consists of a riveted double channel, with a metal cover plate that projects about 1 in. beyond the interior channel flange.
- The steel framing exhibits little to no corrosion and is encased in concrete/mortar that is generally intact and not friable (cannot be crumbled by hand).
- The concrete/mortar encasement provides about 2 in. of cover at the top cover plate at the interior.
- The concrete/mortar encasement is set on a hard joint of the brick below.
- Two metal 3/8 in. diameter straps are bent around the inner flange of the double channel and exhibit little to no corrosion.
- The brick masonry backup is at least three wythes thick.

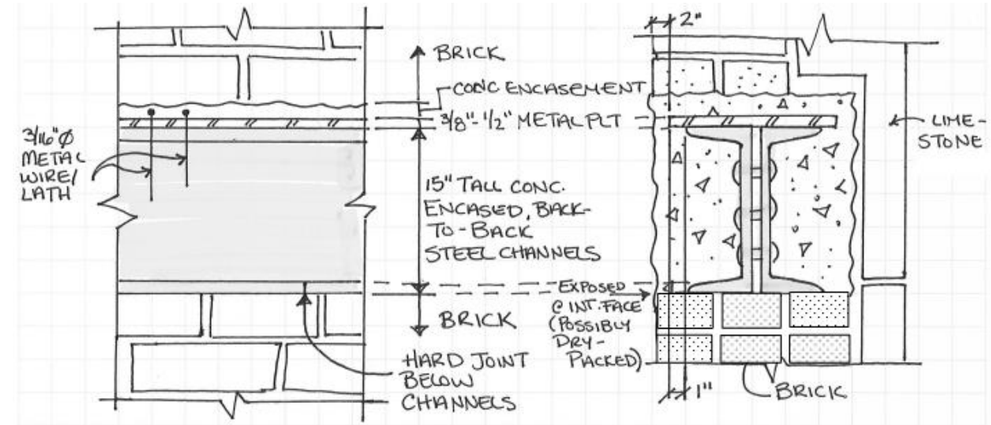

Figure 1 – Sketch of Concrete-Encased Steel Framing Based on Review of Interior Probes at Floor Lines

Based on this preliminary walkthrough and visual review, as well as our review of the 2018 *Condition Survey Report* by VA, we worked collaboratively with BCA and Silman to choose exterior probe locations that would serve "double duty" for both SGH's investigation of the limestone cladding and Silman's condition assessment of the structure. With BCA's approval and the approval of the City of Springfield, we also arranged for Summit to assist the team by providing lift access and making and repairing the exterior probes in the limestone cladding and brick masonry backup.

4.2 Review of Probes

On 12 April 2019, Benjamin M. Lueck of SGH reviewed probes in the limestone cladding at the tower.

SGH and Silman selected the seven probe locations, identified as P1-P7 in Appendix A, on the northeast, northwest, and southwest elevations between the elevated plaza at the base of the tower and the height of the first interior landing (Photo 1). Collectively, we selected these seven probes to expose a variety of structural members and capture a representative range of limestone cladding conditions, as summarized below.

- **Probe P1 – Limestone at Spandrel Beam:** The limestone within the vicinity of Probe 1 exhibits several shallow spalls where it is adjacent to mortar joints (Photo 3). The limestone is notched (i.e., cut-out) to accommodate the spandrel beam flange (Photo 4). We observed a corroded kerf anchor at the top of the limestone removed (Photo 5). The flange of the steel framing is exposed at this location.

- **Probe P2 – Limestone at Intermediate Spandrel Beam:** We did not observe any obvious signs of deterioration or displacement of the limestone unit at this location prior to removing the stone (Photos 6 and 7). The flange of the steel framing is exposed at this location.

- **Probe P3 – Limestone at Corner Column:** The limestone at this location is L-shaped in plan. To expose underlying conditions, the contactor removed the east portion of the L-shaped limestone, which exhibited some vertical cracking and spalling prior to removal (Photos 8 and 9). The crack continues through the full height of the stone directly above Probe P3. Note that Probe P3 is located at the height of the first landing spandrel (i.e., in the same course as Probes P1 and P5). A portion of the corner column steel is exposed.

- **Probe P4 – Limestone at Spandrel Beam:** The limestone at Probe P4, the bottom of the first landing spandrel beam (one course below Probes P1, P3, and P5), was displaced outward about 1/2 in. prior to removal, and multiple stones above, below, and adjacent to Probe P4 are spalled at their edges (Photo 10). The spandrel beam steel is exposed at this location (Photo 11).

- **Probe P5– Limestone at Spandrel Beam at Window Sill/Jamb:** SGH selected two stones for removal at this location: one at the top of the spandrel beam below the window sill and one at the bottom of the jamb (Photo 12). The stone adjacent to the jamb appears to be a previous repair that is cracked and sounds delaminated when tapped with a hammer. The flange of the steel framing is exposed at this location (Photo 13).

- **Prove P6 – Limestone at Field of Wall:** This probe was selected to represent "field of wall" conditions away from structural members (Photos 14 and 15). It is located one course higher than the first landing spandrel beam. The stone exhibited shallow spalls along the edges prior to removal (Photo 14).

- **Probe P7 – Limestone at Corner Column:** Similar to Probe P3, the opening of the limestone at Opening P7 is L-shaped in plan, and the east portion of the L-shaped stone exhibited some cracking prior to removal. The crack continues for multiple courses above and below Probe P7 (Photos 16 and 17). A portion of the corner column steel is exposed.

Note that SGH and Silman proposed several additional probes in the exterior of the tower masonry walls at higher elevations, but this exploratory work was not approved by the City of Springfield due to requiring larger aerial lift equipment to provide hands-on access.

4.2.1 Existing Wall Construction

Based on our review of the seven probes described above, the limestone cladding is constructed as shown in Fig. 2 below. The coursed ashlar units of limestone are typically 16 in. tall and about 24 in. wide, except at corners where units are L-shaped (Photo 18). The depth (thickness) of the limestone units varies from 4 in. to 10 in. In the course above the spandrel beam, we observed 8 to 10 in. limestone units extending into the first wythe of the brick backup (Photo 19).

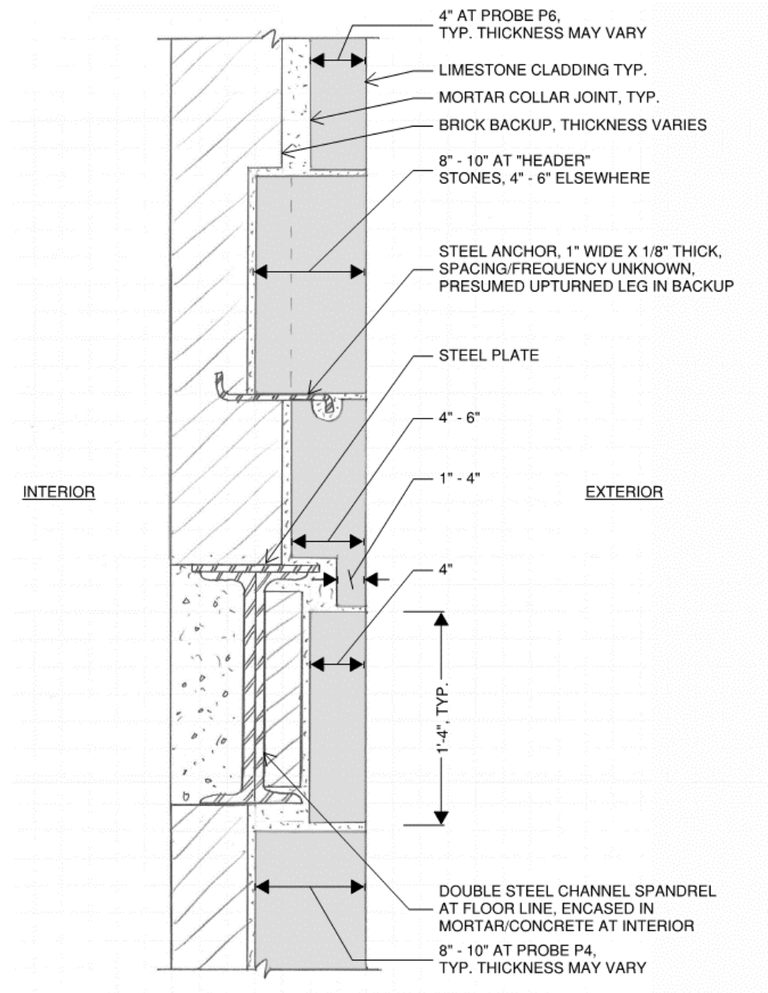

Figure 2 – Typical Wall Construction Based on Review of Seven Probes at the Springfield Campanile

Given the limited number of probes conducted, we do not know how regularly or frequently these "header" stones occur, but the frequent shifting of the plane of interface between the back face of the limestone and outer face of the brick masonry backup suggests that the limestone cladding was installed concurrently with the brick masonry backup.

The spandrel beam at the first landing consists of two back-to-back steel channels, with a steel cover plate at the top flanges of the channels that overhangs the outer edge of the channel flanges by 3/4 in. at the exterior (Fig. 2). A horizontal steel plate is attached to the north corner column at the same height as the top of the first landing spandrel.

At each of the three probes aligned with the top of the spandrel (i.e., Probes P1, P3, and P5), the lower 4 to 5 in. of each limestone unit is cope-cut/notched out and the resulting horizontal "shelf" appears to bear on the outer few inches of the horizontal plate (Photos 20 – 22). Approximately 1/4 inch of mortar is present between the top surface steel plate and the limestone unit. The notched-out portion of the stone ranges from about 1 and 4 in. in thickness, depending on the location and total thickness of the stone. The outer edge of the horizontal plate at the spandrel and the column is typically within 1 to 2 in. of the back side of the narrower section at the base of the stone (Photo 23).

At the intermediate spandrel probe (Probe P2), the limestone is roughly chipped out and does not appear to be in direct contact with the steel plate (Photo 24).

The course at the top of the first landing spandrel is the only location where we observed metal anchors or ties between the limestone cladding and backup. The limestone is restrained at the top side of the stone by a single steel kerf anchor at Probes P1 and P3 (Photo 5). The anchors exposed at these probes are approximately 1 in. wide by 1/8 in. thick steel plate, embedded in the inner brick wythes and bent down 1 to 1-1/2 in. at the outer end to engage a kerf cut into the top face of the unit. We also observed indications of a kerf anchor (i.e., corrosion staining at the top of the stone) at Probe P5 (Photo 25); however, we did not observe evidence of a kerf anchor below Probe P6 (Photo 15), which is in the same course as Probes P1, P3, and P5.

4.2.2 Existing Condition of the Wall Materials

The limestone appears to be Indiana limestone, based on a visual comparison of color, texture, and grain size and structure between a sample removed from the tower and verified samples of Indiana limestone in our office. The samples removed from the tower exhibit no obvious signs of internal deterioration mechanisms (e.g., gross inclusions, cracking, voids, fissures, etc.).

The limestone joints appear to have been repointed prior to our assessment, as overrun from a cutting tool has damaged the limestone above and/or below some head joints (Photo 26). The mortar present in the outer 1 to 2 in. of the limestone joints is a slightly darker shade of gray and

much harder relative to the mortar present farther back in the joints (Photo 27). The outermost mortar is generally intact, with some bond line separation, cracking, and displacement occurring at areas of limestone distress. The lighter-colored mortar in the rear of the limestone joints appears to be similar in color and composition to the mortar present in the collar joint between the limestone and brick backup. The brick masonry mortar is a darker shade of gray than both mortars associated with the limestone.

The mortar beyond the outermost 1 to 2 in. of the limestone joints (including the collar joint) is soft and friable at most of the probe locations. The collar joint is generally filled with mortar where the limestone is installed against the brick masonry backup, with the exceptions of localized cracks and voids that are scattered throughout (Photo 28). Larger gaps and voids in the mortar are typical at structural members and at locations where the limestone was displaced prior to removal (Photo 29).

Where exposed at six of the seven probes, the steel framing exhibits corrosion. This corrosion varies from mild surface corrosion to heavy corrosion with expansion of corroded scale, and visible section loss. Generally, the areas where the steel framing is closest to the outer surface (i.e., least "cover" on the steel) exhibit the most extensive corrosion, whereas the areas where the steel framing is farthest from outer surface (i.e., most "cover" on the steel) exhibit the least corrosion. At the spandrel and column probes on the north corner of the tower (Probes P3, P4, and P7), corrosion, expansion, and section loss is more severe (Photo 30). Similarly, the probe below the window on the northeast elevation (Probe P5) exhibits section loss in corroded areas (Photo 31). These four probes (Probes P3, P4, P5, and P7) are the only locations where the limestone was cracked and/or displaced prior to removal.

Generally, the exposed kerf anchors at Probes P1 and P3 have about 3 to 4 in. of limestone "cover" and exhibit surface corrosion. While the kerf anchors at Probes P1 and P3 are in similar condition, the spandrel beam cover plate exposed at Probe P1 exhibits less corrosion than the steel at Probe P3. We did not observe a pattern of crescent-shaped edge spalls (typical of corroded kerf anchors) at these locations or elsewhere on the tower.

5. DISCUSSION

5.1 Underlying Causes of Limestone Deterioration

The primary cause of the deterioration of the limestone cladding that is readily visible from the exterior and documented in VA's 2018 condition assessment (e.g., spalling, cracks in mortar joints, cracks in stone, displacement of stone, etc.) appears to be applied stresses to the limestone, primarily from corrosion of the underlying steel framing, possibly in combination with unaccommodated movement (e.g., thermal and moisture-related expansion/contraction).

General weathering and degradation of the limestone (e.g., via erosion, acid rain, or freeze/thaw cycling) does not appear to be a factor in the visible deterioration of the limestone.

Mechanical damage (e.g., overcuts and edge chipping along the edges of the ashlar-cut limestone blocks) is also evident and likely occurred during mortar removal in prior repointing efforts, although this damage tends to be considerably smaller and less severe than the cracking from the corrosion of the embedded steel framing.

Since our investigation was limited to the first landing and below, we do not know whether similar conditions exist at higher elevations. We expect the causes to be the same, and the conditions to be similar but progressively worse at higher areas of the tower, due to increased exposure. The overall pattern of distress documented in the VA condition assessment and understanding that the top terra-cotta clad portion of the tower was rebuilt in the 1960s of the original construction supports the expectation that conditions may be worse at higher, more exposed portions of the tower.

5.2 General Construction

While many units are cracked and/or spalled at edges, the limestone itself is in good condition, and we anticipate the majority of units are salvageable where no damage is apparent at the exterior surface. Due to the limited number of probes, we do not know what percentage of the units are header stones. In general, despite the presence of soft mortar and open voids in the collar joint, we did not observe obvious signs that the limestone cladding is separating from the backup (i.e., bulging or displaced outward relative to the vertical plane of the wall). Isolated locations where the limestone units are displaced appear to coincide with corrosion of the steel framing at spandrel beams and columns.

We do not know whether the bearing connection at the spandrel is intentional at floor lines and/or it exists at every floor line. Based on the era of construction, a bearing connection (whether it be continuous or discrete bearing points) is likely either at every floor line or at every other floor line.

The only location where we observed kerf anchors is the course aligned with the top of the first landing spandrel. We do not know if this is a typical condition (i.e., anchors typically occur directly above spandrel beams). Given that we did not observe an anchor at this location below Probe P6, it is possible that kerf anchors are not installed at every stone in this course.

Based on the era and style of construction, it is likely that the kerf anchors observed during our investigation have either an upturned or downturned leg at the end embedded in the brick masonry, although we did not see the back end of the anchor. While the kerf anchors we observed were corroded, these anchors did not coincide with limestone distress or deterioration. It does not appear that the level of corrosion at the kerf anchor, given the depth of the anchor or "cover," is likely to cause surface spalls or cause visible indication of kerf deterioration.

The brick masonry and the steel framing exposed at interior probes appear in generally good condition. Thus, we anticipate that any restoration work required on these two components from the interior of the tower will not be predominantly driven by interior deterioration, but rather will be predominantly driven by logistical issues and access to address deterioration of components at the exterior and core (e.g., middle) of the wall at the exterior (e.g., limestone, kerf anchors, and embedded steel framing).

5.3 Cracking and Displacement

At the exterior probes, the extent and severity of corrosion in the underlying steel framing is sufficient to cause the cracking and displacement we identified at the limestone cladding, given that the limestone is generally in direct contact with this steel framing at columns, spandrels, and intermediate spandrels. This corrosion is an obvious indication that moisture has been present within the exterior wall assembly for prolonged periods of time. Where cracking does not currently exist in the limestone adjacent to steel framing, we presume that similar conditions are present in the underlying steel and cracking/displacement will occur at some point in the future, as the encased steel begins to progressively corrode, and the volume of corrosion product adds to the expansive forces within the wall system, eventually escalating to the point of cracking and displacing the limestone itself.

The profile of the stones at the spandrel beam – where the bottom edge is cut to fit around the steel beam – creates a condition where the thinnest section of the limestone occurs closest to the corroding steel, with an inherent stress concentration in the stone at the 90° interior corner cut (Fig. 3; indicated in red),. The horizontal surfaces of the steel at the spandrel level also disrupt the vertical path of water within the collar joint, likely leading to increased moisture at a point where the materials are more susceptible to damage.

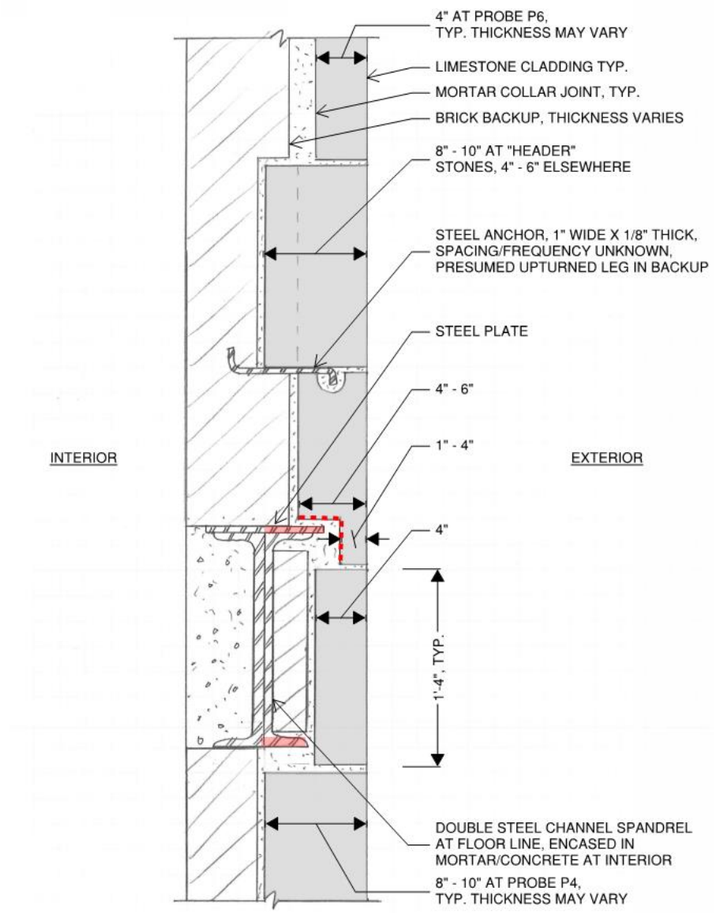

Figure 3 – Typical Wall Construction indicating the relative location of exterior horizontal stell projections that are most susceptible to corrosion (areas shaded red) and are often adjacent to 90 degree cut corners of the limestone (dashed line)

In addition to corrosion of the underlying steel, unaccommodated differential movement of the masonry and steel (e.g., unaccommodated differential expansion/contraction) may also contribute to some of the cracking of the limestone cladding, particularly at building corners. The L-shaped corner units are particularly vulnerable to vertical cracking, as expansive forces on both sides of the corner column stress the stone in perpendicular directions. Cracks in the limestone or mortar, whatever the cause(s), provide paths for bulk water infiltration, which exacerbates the problem.

At all seven probes, the existing mortar in the collar joint is loose and friable with cracks and voids throughout. These conditions allow water to migrate relatively freely behind the limestone cladding while also retaining moisture within the collar joint.

5.4 Edge Spalling of Limestone

The spalling present at the edges of limestone units is likely due at least in part to mechanical damage during removal of mortar during repointing.

A second well-known theory in historic preservation literature for such damage is from that this type of edge damage of stones can result directly from the use of a relatively hard repointing mortar at the exterior of a relatively soft or weak stone or brick unit, with a relatively soft or weak mortar in the remainder of the stone. While we did not conduct laboratory review of the outermost layer of mortar to determine its composition or measure its hardness, it is noticeably harder to break apart by hand than the mortar in the collar joint, which is assumed to be original. However, we think this second theory is less likely the cause, as even the harder outer portion of the mortar generally appears weaker than the limestone.

5.5 Conceptual Design Alternatives

Based on conversations with BCA and the structural engineers at Silman, we outline the following concept-level rehabilitation options, with Options 1 to 3 in order from:

- least to most invasive,
- least to most comprehensive,
- least to most durable,
- greatest to least risk and anticipated maintenance.

5.5.1 Option 1A – Bare Minimum Scope

This option consists of the following scope:

- Remove all limestone and expose all steel framing at the following locations:
    - At all locations of underlying embedded steel spandrel beams, and gravity connections to columns, as described in Silman's report.
    - At all locations of cracked or spalled limestone (e.g., column corners).
    - At all locations of relatively continuous horizontal cracks in mortar bed joints.
    - At all locations of horizontally displaced (i.e., bulging) limestone.
- We estimate at least 25% – 30% of the limestone will need to be removed and reinstalled (if undamaged) or replaced (if damaged) in this option.
- Clean, coat, and repair, or replace steel framing where exposed per Silman's recommendations.
- Replace all kerf anchors encountered during limestone removal with stainless steel kerf anchors.
- Reinstall undamaged limestone blocks, replacing damaged blocks in kind (with matching Indiana limestone and coursing).
- 100% repoint the limestone facade.

We outline the relative advantages and disadvantages of Option 1 as follows:

- Advantages:
    - Least invasive.
    - Lowest cost.
- Disadvantages:
    - Does not expose or allow access to evaluate or repair deteriorated mortar or brick masonry backup beneath the majority of the limestone cladding.
    - Does not expose, evaluate, repair, or protect the majority of the steel framing.
    - Least reliable and least durable.
    - Greatest risk.
    - Highest ongoing maintenance needs and highest maintenance costs moving forward.

5.5.2 Option 1B – Bare Minimum Scope with Cathodic Protection

This option consists of the following scope:

- Same as Option 1A above, except add an impressed current cathodic protection system to protect all embedded steel framing from corrosion (including all steel framing that is not exposed during the work). We estimate that at least 25% – 30% of the limestone will need to be removed and reinstalled (if undamaged) or replaced (if damaged) in this option; however, some additional removal of limestone and/or brick backup may be required to install the cathodic protection system.

We outline the relative advantages and disadvantages of Option 1B as follows:

- Advantages:
    - Least invasive (similar to Option 1A).
    - Likely second-lowest cost (enlist cathodic protection consultant to confirm).
    - Likely offers corrosion protection for all embedded steel framing that is sufficiently in contact with the adjacent masonry (i.e., reduces the rate of future corrosion, but does not address corrosion or section loss that has already occurred). Note that we do not currently know how much of the steel framing would be a candidate for cathodic protection or how effective the masonry would be in conducting current (enlist cathodic protection consultant to confirm).
- Disadvantages:
    - Does not expose or allow access to evaluate or repair deteriorated mortar or brick masonry backup beneath the majority of the limestone cladding.
    - Does not expose, evaluate, or repair the majority of the steel framing.
    - Likely less reliable and less durable than Options 2 and 3.
    - Greater risk than Options 2 and 3.
    - Likely second-highest ongoing maintenance needs and maintenance costs moving forward, even if cathodic protection is highly effective, for the following reasons:
        - Deteriorated mortar or brick masonry backup beneath much of the limestone cladding would not be addressed.
        - Any loss of section in the structural steel framing would not be apparent or addressed via localized repair in areas where limestone cladding is to remain. Note that cathodic protection only reduces the rate of future deterioration and does not restore existing loss of steel section.
        - The impressed current cathodic protection system adds continuous electrical use and electricity costs moving forward).

5.5.3 Option 2 – Moderate Scope

This option consists of the following scope:

- Same as Option 1A above, except add to the scope of removal (of limestone to expose underlying steel framing) at all areas of steel framing (including all spandrel beams, all columns, and all diagonal bracing). We estimate that at least 65% – 70% of the limestone will need to be removed in this option.

We outline the relative advantages and disadvantages of Option 2 as follows:

- Advantages:
    - Second-most comprehensive.
    - Second-most reliable and durable.
    - Second-lowest likely maintenance needs and maintenance costs moving forward.
    - Second-least risk.
    - Exposes and allows for evaluation and repair of all the steel framing.

- Disadvantages:
    - Does not expose or allow access to evaluate or repair deteriorated mortar or brick masonry backup beneath some of the limestone cladding.
    - Most challenging in terms of the construction logistics of sequencing and temporary support of the masonry scheduled to remain (given the large but incomplete areas of limestone and brick masonry backup scheduled to remain in place).
    - May potentially be the most expensive option because of the added construction logistics and temporary support/sequencing challenges noted above.
    - Similar to Option 3 in terms of cost and construction duration because of the added construction logistics and temporary support/sequencing challenges noted above.
    - Likely less reliable and less durable than Option 3.
    - Greater risk than Option 3.

5.5.4 Option 3 – Comprehensive Scope

This option consists of the following scope:

- Same as Option 2 above (i.e., at least 65% – 70% of the existing limestone to expose all underlying steel framing), except that this option requires an additional 20% removal of limestone to address concealed conditions and/or provide mechanical (kerf) anchors at regular intervals throughout the facade (i.e., at and beyond the steel framing). Thus, this option requires a total limestone removal scope of at least 85% – 90%.

  Because of the high percentage of stone removal required in this option, we recommend Option 3 include full removal of the limestone because of the following advantages compared to partial stone removal:

  - Full removal significantly reduces the construction schedule and logistics required to perform the work (e.g., to shore and temporarily support the 10% – 15% of the limestone that could potentially remain in place in Option 2).

  - Provides significantly better long-term performance (i.e., addresses all underlying masonry deterioration, not just deterioration that exists within the vicinity of steel framing).

  - Provides the opportunity to strategize installation of new and existing limestone (i.e., to blend new and existing together in a logical way) that improves the overall aesthetic. In all other options, the aesthetic implications of limestone work are primarily dictated by the required exposure of steel framing.

We outline the relative advantages and disadvantages of Option 3 as follows:

- Advantages:
    - Most comprehensive.
    - Most reliable and durable.
    - Lowest likely maintenance needs and maintenance costs moving forward.
    - Least risk.

- Exposes and allows access to evaluate or repair deteriorated mortar or brick masonry backup beneath all of the limestone cladding.
- Exposes and allows for evaluation and repair of all of the steel framing.
- Less challenging in terms of the construction logistics of sequencing and eliminates temporary support of the masonry scheduled to remain than Option 2.
- Potentially similar to or less expensive than Option 2 because of the added construction logistics and temporary support/sequencing challenges for Option 2 noted above.
- Potentially similar to construction duration of Option 2, despite removing more limestone, because of the added construction logistics and temporary support/sequencing challenges for Option 2 noted above.

- Disadvantages:
    - Most invasive.
    - Significant cost.
    - Significant construction duration.

6. RECOMMENDATIONS

We recommend Option 3 as described above, based on its greater reliability and durability, and its lesser risk and anticipated maintenance than all other options we evaluated and described herein.

We do not recommend Options 1 or 2 for the following reasons:

- While Option 2 is similar to Option 3 in terms of exposing and addressing the underlying steel framing, with respect to the limestone, it is more logistically difficult to execute than, as costly or more costly than, and not as reliable or durable as Option 3.
- Option 1 does not expose or address all of the underlying structural steel framing deterioration and thus does not address underlying problems that have caused limestone deterioration. Option 1 is not as reliable or durable as Options 2 or 3.
- Options 1 and 2 do not address concealed conditions and/or inherent shortcomings of the existing limestone cladding (e.g., lack of regularly spaced kerf anchors, deteriorated mortar at collar joints, etc.) beyond areas where the steel framing is exposed and/or areas where limestone deterioration is evident at the surface.

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APPENDIX A

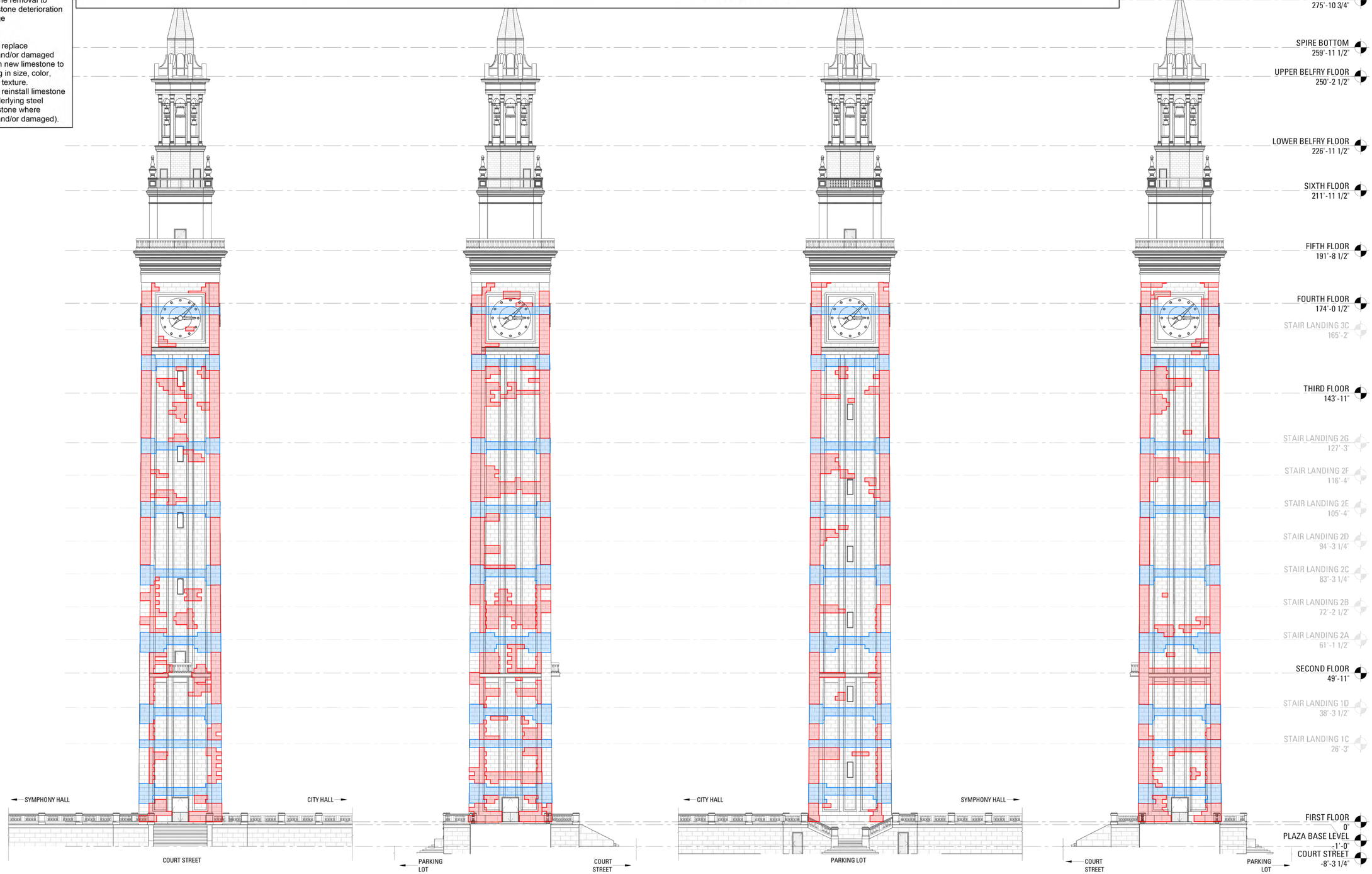
Exterior Limestone Probe Layout Plan

Option 1

Legend:
Blue=Limestone removal to expose underlying structural elements
Red=Limestone removal to address limestone deterioration and/or damage

Notes:
-Remove and replace deteriorated and/or damaged limestone with new limestone to match existing in size, color, coursing, and texture.
-Remove and reinstall limestone to access underlying steel (replace limestone where deteriorated and/or damaged).

Total Limestone Removal: 47%
- Limestone removal due to deterioration: 28% (Remove and Replace)
- Limestone removal to expose underlying structural elements: 19%
  - Damaged limestone removal to expose underlying steel from structural elements: 7% (Remove and Replace)
  - Undamaged limestone being removal to exposed underlying structural elements: 12% (Remove and Reinstall)



1 SOUTHEAST ELEVATION
SCALE: 1/16" = 1'-0"

2 SOUTHWEST ELEVATION
SCALE: 1/16" = 1'-0"

3 NORTHWEST ELEVATION
SCALE: 1/16" = 1'-0"

4 NORTHEAST ELEVATION
SCALE: 1/16" = 1'-0"

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Rev	Date	Remarks

Date	2 JAN 2019
Scale	1/16" = 1'-0"
Project Number	18.016
Drawn By	Author

SCHEMATIC DESIGN

Springfield Campanile Limestone
Scope Options Quantity Take-Offs
SGH Project Number 181599
28 October 2019

EXTERIOR ELEVATIONS

A-301

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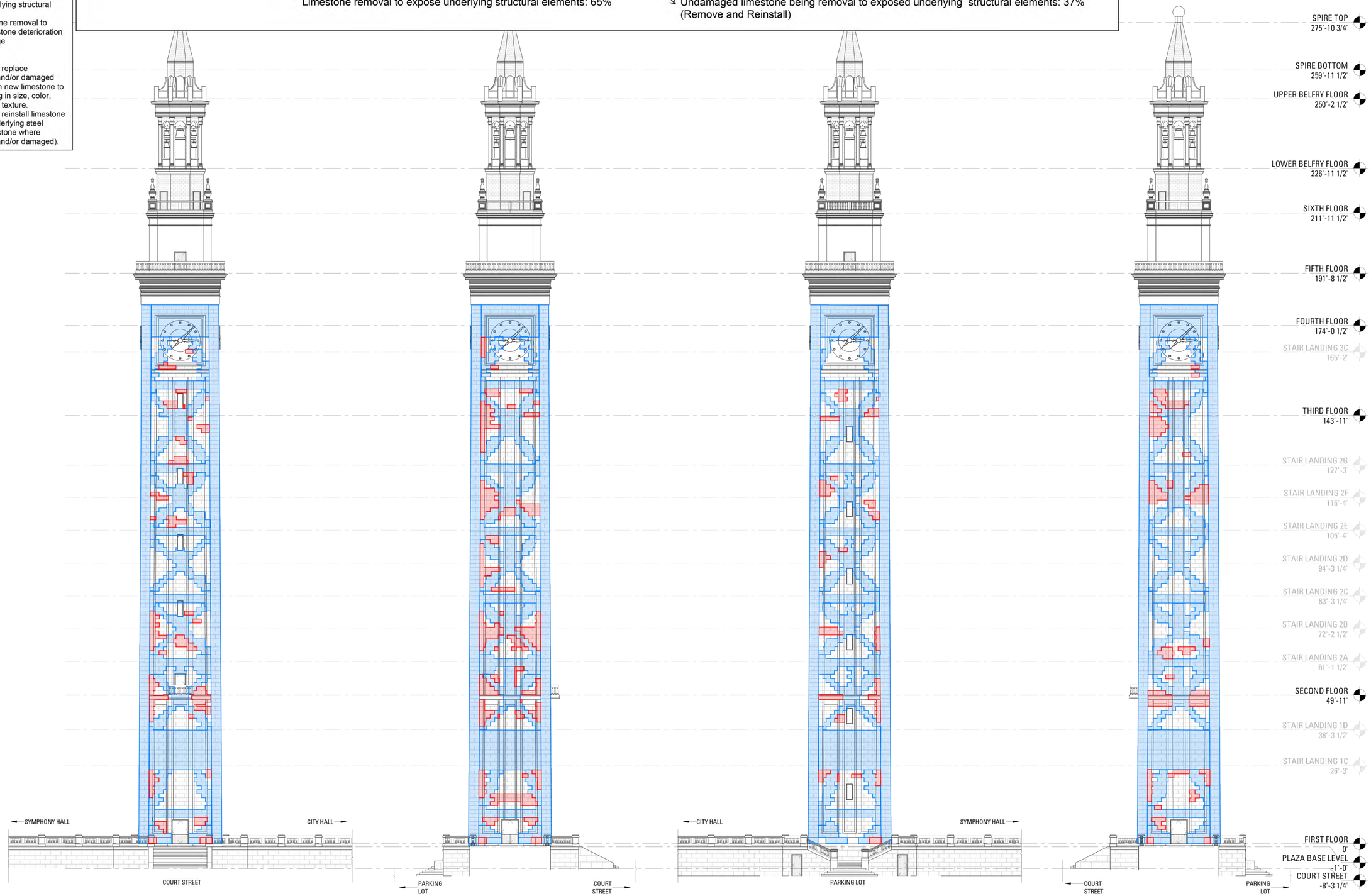
Option 2

Legend:
Blue=Limestone removal to expose underlying structural elements
Red=Limestone removal to address limestone deterioration and/or damage

Notes:
-Remove and replace deteriorated and/or damaged limestone with new limestone to match existing in size, color, coursing, and texture.
-Remove and reinstall limestone to access underlying steel (replace limestone where deteriorated and/or damaged).

Total Limestone Removal: 72%
- Limestone removal due to deterioration: 7% (Remove and Replace)
- Limestone removal to expose underlying structural elements: 65%
  - Damaged limestone removal to expose underlying steel from structural elements: 28% (Remove and Replace)
  - Undamaged limestone being removal to exposed underlying structural elements: 37% (Remove and Reinstall)



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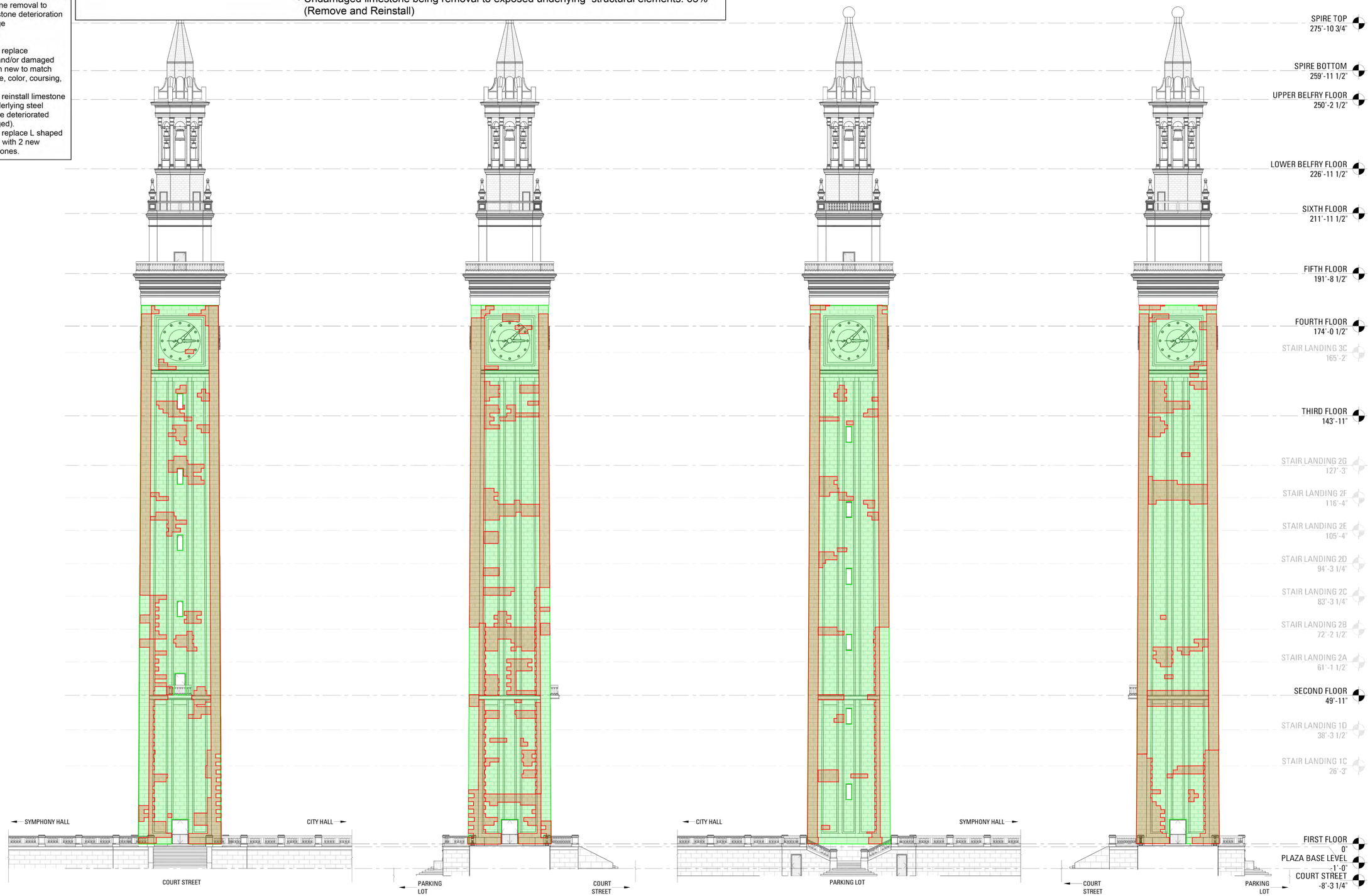
Option 3

Legend:
Green=100% Limestone removal
Red=Limestone removal to address limestone deterioration and/or damage

Notes:
-Remove and replace deteriorated and/or damaged limestone with new to match existing in size, color, coursing, and texture.
-Remove and reinstall limestone to access underlying steel (replace where deteriorated and/or damaged).
-Remove and replace L shaped corner stones with 2 new rectangular stones.

Total Limestone Removal: 100%

- Damaged limestone removal to expose underlying steel from structural elements: 35% (Remove and Replace)
- Undamaged limestone being removal to exposed underlying structural elements: 65% (Remove and Reinstall)



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Building Code Analysis and Threshold Report

AKF Group LLC

99 Bedford Street, 2nd Floor
Boston, MA 02111

Project Team:

Jay Ierardi, PE, PhD
Jonathan Mirabito

AKF

External Memorandum

Issue Date: September 19, 2019

To: Ken Guditz
Bruner/Cott Architects
225 Friends Street, Suite 701
Boston, MA 02114

From: Jonathan Mirabito & Jay Ierardi, PE, PhD
September 19, 2019
Springfield Campanile
190458-000

ENCLOSED:

● Memorandum ○ Telephone Record ○ Meeting Minutes ○ Field Observations

COMMENTS:

Dear Mr. Guditz,

Please find the code summary for the conditions at the Springfield Campanile below.

1. Introduction

This narrative report outlines the thresholds for code compliance in existing buildings as they apply to the proposed scope of work at the Springfield Campanile. The footprint of the existing tower is approximately 729 SF. Springfield has commissioned an architectural study to evaluate the necessary repairs of this historic tower. The tower is also undergoing a feasibility study for future renovations. The existing building is four stories above grade and contains two observation decks (upper and lower observation decks), a belfry level, and a spire level.

The scope of work will include structural and façade improvements, fixing the chime bells and four-sided clock, and repairing the existing elevator.

The code requirements described in this report are not applicable to all scopes of work and are intended to inform the decision-making process by clarifying the code implications of renovations, additions, and

changes in use. The various thresholds of the Massachusetts State Building Code, Plumbing Code, Access Code, Americans with Disabilities Act, and Massachusetts General Law will be covered.

2. Quick Facts

Building Footprint: ~729 SF

Height: 6 stories (approx. 250 ft)

Sprinkler Status: Non-sprinkled

Construction Type: Type IIIA

Occupancy Classification: Use Group B

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3. Applicable Codes & Standards

- Massachusetts State Building Code (780 CMR), Ninth Edition, Base Volume (2015 International Building Code and 2015 International Existing Building Code with amendments)
- MA Stretch Energy Code (International Energy Conservation Code, 2015 edition with amendments)
- Massachusetts Board of State Examiners of Plumbers and Gas Fitters Regulations (248 CMR)
- Massachusetts Comprehensive Fire Safety Code (527 CMR 1.00 – 2015 NFPA 1: Fire Code with amendments)
- Massachusetts Electrical Code (527 CMR 12.00 – 2017 NFPA 70: National Electrical Code with amendments)
- Massachusetts Architectural Access Board Regulations (521 CMR) [1]
- Americans with Disabilities Act (ADA)
- Massachusetts Board of Elevator Regulations (524 CMR)
- M.G.L. Ch. 148 §26G

Note that the Board of Building Regulations and Standards (BBRS) is currently developing the 10th edition of 780 CMR, which may be based on the 2018 IBC and IEBC. The proposed adoption date at this time is June 2019.

Proposed Uses

In accordance with IBC Chapter 3, the proposed building includes the following uses and occupancies:

- B: Offices; assembly-type spaces that are less than 750 SF or 50 people

4. Major Code Upgrade Thresholds

The following sections outline the requirements to maintain and upgrade major building features including fire protection, accessibility, and means of egress. It should be noted that the building's status as a historic building exempts the building from certain requirements. The exemptions applied as a result of this status are outlined in Section 9, below.

Fire Protection

MA General Law Chapter 148 Section 26A(1/2) requires every building or structure of more than seventy feet in height above the mean grade and constructed prior to January 1, 1975, to be protected with an adequate system of automatic sprinklers in accordance with the provisions of 780 CMR except for the following areas:

- sprinklers shall not be required to be installed in patient rooms in hospitals

[1] Changes to 521 CMR are currently being reviewed by the Building Code Coordinating Council (BCCC). The effective date of these changes is unknown.

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- sprinklers shall not be required to be installed in public or private libraries, or in houses of religious worship
- sprinklers shall not be required to be installed in buildings where construction has commenced prior to January 1, 1975 and which have been submitted to the provisions of Chapter 183 A: Condominiums
- sprinklers shall not be required to be installed in rooms or areas of a telephone central office equipment building when such rooms or areas are protected with an automatic fire alarm system

The Springfield Campanile does not meet any of the aforementioned exceptions and will be required to be protected by an automatic sprinkler system.

Accessibility

Massachusetts Architectural Access Board Regulations (521 CMR)
All new work in all buildings and spaces open to the public (i.e. students, visitors, etc.) must be designed in accordance with 521 CMR. Additionally, accessibility improvements may be required outside of the project scope of work based on the cost of work being completed (521 CMR 3.3). The following thresholds summarize the extent of accessibility upgrades for existing buildings undergoing alterations or repairs:

- If the cost of work is less than $100,000, only new work must comply.
- If the cost of work is at least $100,000 but less than 30% of the assessed building value, in addition to all new work, an accessible public entrance, accessible toilet rooms, telephone, and drinking fountain must be provided (where the building contains public toilets, telephones and drinking fountains).
- If the cost of work exceeds 30% of the full and fair cash value[2] of the building, the entire building must be brought into compliance with 521 CMR.

Note that all work completed within a 3-year period is considered in determining the applicability of 521 CMR 3.3. Major implications of the 30% threshold and full compliance with 521 CMR include an accessible entrance, accessible toilet rooms, handrails, vertical access throughout the building (i.e. a compliant elevator), maneuvering clearance at all doors, accessible seating, etc.

Note that employee-only spaces are not subject to the provisions of 521 CMR, including any spaces that are not open to the public.

AKF anticipates that the total cost of the project will exceed the 30% threshold and thus trigger full accessibility compliance for the clock tower. While a full accessibility upgrade may require reconfiguration of walls (classification of Level 2 or 3 Alterations), IEBC Sections 801.2 & 901.2 provide exceptions that permit reconfiguration of spaces as a result of accessibility upgrades to be exempt from the other requirements of Level 2 and 3 Alterations. As such, only the requirements for Level 1 Alterations are discussed in Section 8 of this report.

[2] "Full and fair cash value of the building" is defined by 521 CMR as "the assessed valuation of a building (not including the land) as recorded in the Assessor's Office of the municipality at the time the building permit is issued as equalized at 100% valuation." An exception states that "if no assessed value exists, or the assessed value is more than three years old, a request to substitute the appraised value may be submitted to the Board. The request to use the appraised value must be submitted by a certified appraiser…and must be submitted prior to obtaining a building permit for the project." (521 CMR 5.1 Definitions)

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In addition, AKF has determined that there is no code requirement necessitating that the existing open elevator be enclosed with shaft construction. This would only be required if the building official order it to mitigate the possible effect of smoke migration through the exit stair. However, given the low fire load of the floor and scope of the project this seems unlikely.

Please see the table included at the end of this report for a full list of proposed variances.

American's with Disabilities Act Standards for Accessible Design
The Americans' with Disabilities Act, 2010 Standards for Accessible Design requires that employee-only spaces must be designed such that individuals with disabilities can approach, enter, and exit the workspace (ADA 203.9). Further, if the altered areas are open to the public, accessibility improvements are required along the path of travel to primary function areas which are altered. However, note that accessibility improvements are not required to exceed 20% of the cost of the alterations, but are expected to be included up to the 20% amount (ADA §36.403)

The ADA further defines a list of priorities for accessible upgrades in the event of disproportionality (i.e. costs exceeding 20% of the alteration costs). The following elements must be provided up to 20% of the project costs in the following order:

1. An accessible entrance
2. An accessible route to the altered area
3. At least one accessible restroom for each sex
4. Accessible public telephones (if public telephones are provided)
5. Accessible drinking fountains
6. Additional accessible elements such as parking, storage, and alarms

Means of Egress

Per the MA amendments to 780 CMR 102.6.4, the building official has the authority to cite (where necessary) the following conditions as a violation and order abatement within a specific timeframe.

- Inadequate number of means of egress
- Egress components with insufficient width or so arranged to be inadequate, including signage and lighting
- Inadequate lighting and ventilation

Note that where full compliance is not practical, the building official may accept compliance alternatives, engineering, or other evaluations that adequately address the deficiency.

Based on the existing condition drawings provided by Bruner/Cott Architects, the stair width of the clock tower is approximately 47.5" across. Using the applicable factors from 780 CMR Section 1005.3.1, the exit capacity of each floor of the building is approximately 158 people. Using a Group B Business occupancy, the expected occupant load will be 15 square feet/person (780 CMR Table 1004.1.2). As the expected occupant load calculation, each floor is expected to have approximately 37 occupants. The exit capacity exceeds the expected occupant load of people using the clock tower.

In addition, means of egress, including exit stair widths, are specifically addressed in the historical buildings section of the International Existing Building Code – as discussed in Section 9 of this report.

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Please see the table included at the end of this report for a full list of proposed variances.

5. International Existing Building Code (IEBC)

The International Existing Building Code (IEBC) provides three separate compliance options, any of which can be used for the proposed renovation project.

Prescriptive Method – New and replacement materials must comply with the code for new construction. However, like materials are permitted for repairs and alterations provided the repairs/alterations do not make the building more hazardous than prior to the repair/alteration (IEBC 301.2.2).

Work Area Method – Proportional compliance approach where upgrades are triggered by the type and extent of work.

Performance Method – Provisions are based on a numerical scoring system involving 21 various safety parameters and the degree of code compliance for each issue. This method is inflexible and not recommended.

The following section provides a discussion of requirements from the Work Area compliance option.

6. Work Area Method

The work area method classifies alterations based on the scope of work being completed. Repairs include the patching, restoration, or replacement of damaged materials, equipment, or fixtures to maintain the existing systems in working order (IEBC 502.1). Level 1 alterations include the removal, replacement or covering of existing parts of the building (IEBC 503.1). Level 2 alterations include any reconfiguration of spaces including the addition or elimination of any door or window, changes to any system, or the installation of any additional equipment where the work area is equal to or less than 50% of the area of the building (IEBC 504.1). Level 3 alterations apply where the work area includes the reconfiguration of space in more than 50% of the aggregate area of the building (IEBC 505.1).

Note that the requirements of the Work Area Method are all inclusive as the Level of Alteration increases. For example, in addition to IEBC Chapter 8 for Level 2 Alterations, such work must also comply with the provisions for Level 1 Alterations (IEBC Chapter 7). Likewise Level 3 Alterations must comply with the requirements for Level 1, 2, and 3 (IEBC Chapters 7, 8, and 9). This should be kept in mind while reviewing the following sub-sections.

It is our understanding that the scope of work will be classified as a Level 1 Alteration, as no walls or windows will be reconfigured as part of the work.

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7. Repairs

New and replacement materials must comply with the code for new construction. However, like materials are permitted for repairs and alterations where the existing conditions are not considered an unsafe condition (IEBC 602.2). In general, the existing level of safety and protection throughout the building (i.e. fire protection, means of egress, mechanical systems, etc.) must be maintained when repairs are made. Structural repairs must be reviewed with a structural engineer for compliance with IEBC 606.1.

8. Level 1 Alterations

Similar to repair work, the existing level of safety and protection throughout the building regarding fire protection and means of egress must be maintained for Level 1 Alterations.

Interior Finishes

All newly installed interior trim materials, and interior wall, ceiling and floor finish (including new carpeting) must comply with the code for new construction based on Use Group of the space (IEBC 702).

Finish Characteristics

Element	Test Method	Criteria
Wall & Ceiling Finishes	ASTM E84 or UL 723	Class A = FSI 0-25; SDI 0-450
		Class B = FSI 26-75; SDI 0-450
		Class C = FSI 76-200; SDI 0-450
Floor Finish	NFPA 253	Class I = 0.45 W/cm^2 or greater
		Class II = 0.22 W/cm^2 up to 0.45 W/cm^2
	DOC FF-1	Pass

FSI = Flame Spread Index
SDI = Smoke-Development Index

Table 703.9 Interior Wall and Ceiling Finish Requirements by Occupancy

Partially and Unsprinklered Buildings					
Use Group	Walls & Ceilings			Floors	
	Exit Enclosures and Exit Passageways	Corridors	Rooms and Enclosed Spaces	Exits and Corridors	Other Spaces
B	A	B	C	II	DOC FF-1

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Fully Sprinklered Buildings					
Use Group	Walls & Ceilings			Floors	
	Exit Enclosures and Exit Passageways	Corridors	Rooms and Enclosed Spaces	Exits and Corridors	Other Spaces
B	B	C	C	DOC FF-1	DOC FF-1

Note that where corridors and exit enclosures are shared by more than one occupancy, the most restrictive finish must be used.

Energy Conservation

Alterations are permitted without requiring the entire building to comply with the 2015 IECC (IEBC 708.1). Only those systems or portions of the building that are altered are required to comply with the energy conservation requirements for new construction. Note that per IECC C501.2, existing commercial buildings must comply with either the IECC or ASHRAE 90.1.

In general, additions, alterations, renovations, or repairs, must comply with the applicable new construction requirements; however, there are several exceptions. Where the energy use of the building is not increased, window replacements need not comply with the requirements for new construction if only the glass is replaced in an existing sash and frame. In addition, if the energy use is not increased, existing ceiling, wall, or floor cavities that are exposed during construction need not comply with new construction requirements if the cavities are already filled with insulation (IECC C502.1 & C503.1).

AKF anticipates that the building is not conditioned and thus commissioning requirements will not be applicable under the scope of this project.

9. Historic Buildings

Repairs

Repairs must be permitted with like materials of the building using the original methods of construction. A dangerous building must have no work done other than to correct unsafe conditions. Replacement of existing or missing features are permitted using the original materials.

Fire Safety

Every historic building that constitutes a distinct fire hazard shall be provided with an approved automatic fire-extinguishing system, which shall not detract from the required number of exits.

Means of Egress

The requirements of minimum width and door swing specified in the code may be ignored pending the decision of the code official as to whether the means of egress are adequate for a person to safely exit the building.

AKF

Interior Finishes

Existing finishes are acceptable provided they are historic.

Stairway Enclosure

Buildings of 3 stories or less shall have exit enclosures which limit the spread of smoke, but these are not required to be fire rated.

One-Hour Fire-Resistance Assemblies

Where 1-hour fire-resistance rated construction is required, this need not be provided where the existing wall and ceiling finish is wood or metal lath and plaster.

Glazing in Fire-Resistance-Rated Systems

Historic glazing materials are permitted in 1-hour fire resistance ratings where openings are provided with smoke seals and the area is sprinkled.

Stairway Railings

Grand stairways shall be accepted without complying with handrail and guard requirements provided they are not structurally dangerous.

Guards

Existing guards shall comply with IEBC 505. Spacing between existing intermediate railings or openings shall be accepted.

Exit Signs

Where exit signs or egress path marking location would damage the historic character of the building, alternative signs shall be permitted with approval from the code official.

Automatic Fire-Extinguishing Systems

Historic buildings that cannot conform to the construction requirements of the IBC shall be made compliant with the addition of an approved automatic fire-extinguishing system.

As mentioned in Section 4 above, the building will be required to be protected by an automatic sprinkler system.

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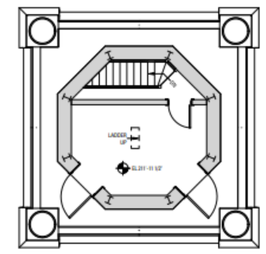
AKF

	AAB REQUIREMENT	EXISTING CONDITION	PHOTOGRAPH	Variance Approach
1	Landings at doors must provide a maneuvering clearance sized in accordance with the direction of approach and door swing (521 CMR Sections 26.6.3 & 26.6.4)	Numerous incidents of insufficient clear space push/pull side clearance were recorded on the lower and upper observation levels. The image to the right is one example, for reference.	 3 FLOOR PLAN - UPPER OBSERVATION	AKF recommends seeking a variance from this requirement on the basis that the observation areas are part of an existing historic structure and extending them would be technically infeasible as it would require additional studies to ensure the stability of the building wuld not be compromised.

Mechanical, Electrical, Plumbing and Fire Protection Systems

BLW Engineers, Inc.

311 Great Road, PO Box 1551
Littleton, MA 01460

Project Team:

Ken Beck PE
William Scanlon PE
Leo Enrico PE
Chuck Mace PE

BLW

September 19, 2019

Mr. Ken Guditz, AIA, LEED AP

Senior Associate

Bruner/Cott Architects
225 Friend St, Suite 701
Boston, MA 02114

RE: **MEP/FP Existing Conditions Survey - Springfield Campanile Tower, 34-36 Court St, Springfield, MA**

BLW Engineers, Inc. (BLW) is pleased to submit our existing conditions survey for the above referenced facility. This report included a summary of existing conditions for all trades along with recommendations. For each trade the recommendations are based on occupying the clock tower and surrounding areas.

Thank you for the opportunity to present this report. If you have any questions or need additional information, please feel free to contact our office.

Very truly yours,

BLW Engineers, Inc.

Bill Scanlon

Bill Scanlon, PE

Principal

BLW ENGINEERS, INC. **CONSULTANTS**
311 Great Road, Post Office Box 1551, Littleton, Massachusetts 01460 T: 978.486.4301 F: 978.428.0067

ELECTRICAL

Summary The electrical report is based on a brief site visit to the Springfield Campanile Tower, City Hall and Symphony Hall building complex, not involving any extensive exploratory work or building life safety assessment with respect to future building alterations. The electrical systems were visually noted and inspected for signs of deterioration and major compliance issues.

This report addresses electrical systems infrastructure only and does not address the clock and Carillon operation.

Electrical Service and Service Entrance Equipment

Power is provided by Eversource electric from a network vault located in the street (City Hall Pl). The complex is served from two services located in the basement of City Hall. Each service feeds a 2500A, 120/208V, 3 phase, 4 wire switchboard. The City Hall switchboard is located in the basement space, manufactured by General Electric and is rated (labeled 2200A, although not typical), 120V/208V, 3-phase, 4-wire. This main switchboard "MSB" has multiple sections;

1. Pull section
2. CT and 2500A main circuit breaker
3. Distribution section "PP1"
4. 1000A circuit breaker distribution section

All switchboards utilize circuit breaker and load break switch technology and distribute the remainder of loads to secondary distribution panelboards and miscellaneous loads located throughout the building.

Voltage: The buildings service is 208V, 3 phase, 4 wire. All larger equipment and panelboards are fed from the switchboards. General purpose receptacles, computer equipment, small motors, smaller HVAC loads, and other miscellaneous branch circuits are all supplied from the 208Y/120V panelboards located throughout the facility.

Condition: The general condition of the switchboards was observed to be in fair condition.

Capacity: Requests were made for the latest utility bill demands, but no information has been provided to date.

Power Distribution

At the base of the Campanile Tower is a wireway that is fed from 2 sets of #3/0 conductors. These conductors are capable of providing approximately 150kV at 208V, 3 phase or 400A of power.

The feeder breaker feeding the wire way and distribution located at the base of the Campanile Tower was not able to be determined, but it is suspected to originate from the area where the switchboards are located. From the wire way there are multiple taps feeding the following labeled loads:

1. Tower Panel – 200A Disconnect
2. Panel BB – 200A (feeds the loads listed below, from panel labeling):
    a. Lighting control loads listed in item #3
    b. Tower elevator
    c. Compressor
    d. Sump Pump
    e. Street lights
    f. Miscellaneous loads in basement area
    g. Tower Lighting
        i. Tower inside stair lighting contactor
        ii. Tower stair lighting contactor
        iii. Tower bracket lighting – No rating on enclosure
        iv. Tower flood lighting – 100A sub panel.

In general, the electrical distribution equipment in the basement of the Campanile Tower is in fair to poor condition.

Equipment Manufacturer's: The power distribution equipment is a Hodge-podge of manufacturers including:

1. ITE Imperial Corporation
2. Westinghouse
3. Murray (now ABB)

Theses manufacturers are of known quality, reputation, and continued service, however the age of all equipment is suspected to be in the range of 40-50 years old.

Back-up Power Generation and Distribution Equipment

The Campanile Tower is currently not served by back-up generator. The Generator located on the site feeds only Symphony Hall.

Cable and Conduit

Power distribution is predominantly accomplished utilizing conduit and conductor. Observed wiring consists of copper conductors with thermoplastic insulation.

Radio cable from the base to the top of the tower was observed to be Heliax coaxial cable. This cable was for fire department and police antennas, but is thought have been abandoned in place.

Lighting System

The existing lighting system installed the Campanile building interior has been replaced with temporary construction style plastic caged string lights located adjacent to and rising up the interior stairwell.

There was no emergency egress lighting provided within the Tower.

Exterior and aesthetic tower lighting was not observed as part of this report, but it was reported to have been in a state of disrepair in the most recent survey.

Fire Alarm System

The fire alarm system within the Campanile tower consist of (2) smoke detectors only, located in the lower level lobby area. These smoke detectors are connected to the main fire alarm control panel serving City Hall.

Lightning Protection

Previous tower reports circa 1999 observed that there is a lightning protection system in place located in the finial at the top of the tower. Without access to this space no such system was observed, however recent pictures of the tower suggest that the system is still in place.

Electrical Recommendations

Summary

In general, all electrical devices within the Campanile Tower are recommended for complete replacement. The existing systems are in various states of disrepair, past the end of their useful life expectancy and/or are no longer energy efficient.

Code Considerations

Code requirements for consideration based on determined occupancy type and permitting requirements include but are not limited to;

1. Back-up power for the Campanile elevator (MSBC requires back-up power for elevators more than 4 stories above the level of exit discharge, with some exceptions)
    a. Refer to elevator report for battery power being recommended for back-up power.
2. Full Fire alarm protection in the tower and its coverage requirements.

Power Distribution

Electrical distribution equipment and components are expected to have a useful life of 30 years. Switchboards, Panelboards, transformers, generators, and wiring systems are typically serviceable for 10 to 20 years beyond this time if properly maintained and not subjected to repeated overloading or short-circuiting conditions.

Given the building's electrical devices, serving the Campanile Tower, are approximate 40-50 years old and well past the end of their useful life, it is recommended that all distribution equipment be replaced.

With regard to the existing feeder; because this feeder is currently feeding all tower lighting, the tower elevator and miscellaneous loads, there does not appear to be reason why this feeder is not adequately sized to handle new renovated loads. In addition, the feeder conductors are in good shape and are a THWN insulation type appropriate for the application. As is always the case, the adequacy of the feeder cannot be determined with certainty until a new design is complete.

The existing wireway set-up should be removed and replaced with a 400A distribution panel that feeds (2) down stream 100A lighting panels for both the interior and exterior of the Tower. Should back-up power be required for the elevator, a generator, ATS and additional panel will be required.

If existing antenna cable has been abandoned in place, it should be removed during renovations.

Lighting Systems

LED lighting is recommended for use throughout the interior of the Tower. Lighting would be controlled via a lighting control panel capable of being controlled by timeclock and photocell in conjunction with integral fixture occupancy sensors. As a major landmark in the City, exterior lighting should be very carefully considered. It is recommended that full color changing lighting capabilities with automated and remote cloud based controls be implemented.

Life safety lighting, provided in the form of wall mounted battery packs with dual heads or lighting fixtures with integral emergency ballasts/drivers will have to be provided in all areas of the Campanile Tower.

Fire Alarm System

The code requirements for Fire Alarm coverage may vary based on the extent of sprinkler coverage required and the determined occupancy of the new space. Regardless of the determined code requirements, it is recommended that a full fire alarm system with beam detectors, notification devices and pull stations be implemented. It is also recommended that the Campanile tower be provided with its own control panel that is capable of being monitored/networked with the existing City Hall main control panel. The proposed fire alarm system should be fully coordinated with the City's fire department.

Lightning Protection System

The existing lightning protection system should be fully tested and inspected for its functional operation as intended in accordance with NFPA 780 requirements.

Electrical Pictures

Existing Main Switchboard located in city hall basement

Wireway line-up located in the basement of the Tower

Lighting panel and controls

#3/0 Feeder conductors

General condition of panel BB located in the tower basement

Antenna cabling (thought to be abandoned in place)

End of Electrical Section

HVAC

Existing Conditions

Steam heat is generated within the central heating plant and steam is distributed with a steam supply and condensate pipe that is extend to the Campanili Building. The space is heated with uninsulated piping distribution and piping radiation system.

The space is not cooled.

Ventilation air within the lobby area is provided with operable doors.

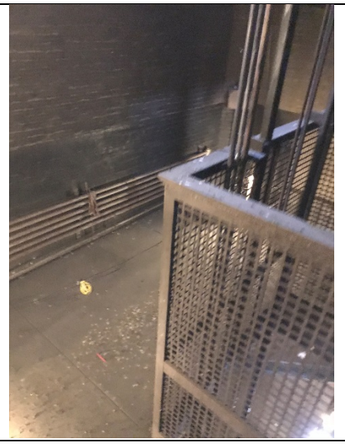
HVAC Recommendations

The heating pipe distribution and pipe radiators appear to be more than 50 years old and show sign of deterioration and steam leaks. The piping system should be removed in its entirety.

BLW would recommend installing a steam to hot water heat exchanger, pumps, piping and water specialties. Hot water pumps shall circulate hot water throughout the building and the spaces shall be heated with new finned tube radiation with covers. Fin tube radiation is recommended at each of the floor levels (6 levels plus basement) at the partial floor slab landings. All new piping shall be insulated and the finned tube radiation shall be controlled with thermostats and control valves. The control valves shall report back to the existing building management system.

Ventilation air shall be provided with a new Energy Recovery Ventilation unit. The ERV shall provide 2000 CFM of supply and exhaust air (total airflow shall reviewed during design). Supply and exhaust air shall be distributed throughout the space with insulated ductwork and shall terminate to air outlets.

Steam Pipe Distribution from Central Plant



Steam Pipe Radiatos

End of HVAC Section

FIRE PROTECTION

Existing Conditions

Currently the building is not provided with automatic fire protection systems.

Recommendations

It is presumed that an automatic fire suppression system will be required complete with new service connection to municipal water, double check valve backflow preventer, main alarm valves, standpipes and fire department connections. Any unheated spaces shall be provided with dry pipe systems.

Pending the requirements of an official code review and where the sprinklers will be required; its recommended that a fire pump is accounted for and is necessary at this time to reach the upper levels of the Campanile.

End of Fire Protection Section

PLUMBING

Existing Conditions

Currently the building is not provided with any domestic, sanitary, vent or natural gas systems. There are existing roof drains located on the observations levels (5th and 6th floors), lower, upper belfry levels and plaza level with existing piping that travels through the building from the drains to the municipal system below ground.

Sanitary facilities are located in the adjacent building and presumed to be adequate for the use of the Campanile. No new facilities will be added.

Recommendations

The roof drains should be replaced and sized for current code. Piping connecting to the roof drains shall be routed through the building as appropriate for new architectural design and connect to the existing municipal system.

End of Plumbing Section

Lerch Bates, Inc.

303 Wyman Street, Suite 300
Waltham, MA 02451

Project Team:

Eric Tragash
Sam Laudati

- Elevator Modernization Survey
- Preliminary Traction Elevator Power Data

LERCH BATES
Building Insight

SPRINGFIELD CAMPANILE
SPRINGFIELD, MASSACHUSETTS

ELEVATOR MODERNIZATION SURVEY

OCTOBER 21, 2019 2019

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LB Project Number 0100020246

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SECTION 1
SUMMARY AND RECOMMENDATIONS

A. GENERAL

Lerch Bates Inc. was commissioned to review the elevator equipment at the Springfield Campanile building, specifically the decommissioned water hydraulic elevator, in consideration of a potential modernization or replacement. The existing elevator equipment condition was evaluated to determine proper component replacement as well as possibility for reuse. Existing building conditions in the elevator machine room, hoistway, and pit were also reviewed for Code compliance, which becomes incumbent with a modernization project.

B. ESTIMATED COSTS

A review of the equipment as reflected in Appendix A has determined that the estimated BUDGET costs for this project for the elevator equipment portion should be:

Units	Low	High
Per Elevator	$400,000	$500,000

Please note this estimate is for the elevator contractor labor and material portion of the project only and does not include the related building work in Appendix B. Appendix B should provide enough information relative to the specific related work on these units so a General Contractor can provide a budget estimate.

'Low' estimate is based on a custom sized elevator with standard finishes and cab enclosure while 'High' estimate is for a fully custom designed elevator with glass panels and architectural finishes.

C. EQUIPMENT DISPOSITION

The existing counterweighted water hydraulic elevator was reviewed, anecdotal information revealed that the elevator has been out of service for over 20 years, but was formally decommissioned in 2005. This non-operational counterweighted water hydraulic elevator was originally installed by Otis Elevator with an upgrade at some point in the life cycle by General Elevator of Hartford Connecticut (now Kone). This elevator is not in working order and cannot be modernized in the typical sense since the existing technology is not consistent for operation and is not safe for the public. When operational, the system used water in a remote storage tank to pressurize the piston for motion. Pressure hydraulic systems are used today but with hydraulic oil as the pressure medium. The existing in-ground piston is a telescopic type with a roped counterweight offset but is far beyond the allowable duty rating of modern hydraulic technology.

The clear hoistway dimensions are 82" wide by 82" deep, we will use this existing space for the new elevator to be installed, but all existing equipment will be removed. This hoistway space is adequate for a custom traction elevator. Traction elevator systems require significant structural support at the top, bottom, and sides of the hoistway. The existing hydraulic system transfers loads to the pit, therefore significant structural support must be provided to support the new elevator system.

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The current cab interior dimensions are 62” wide by 68” deep. The clear cab height is 94” tall measured from the cab floor to the side of the ceiling. The ceiling is dome shaped and has a height of 105” measured from the cab floor to the center of the dome. The new elevator will be the minimum size for accessibility compliance. The existing clear hoistway dimensions barely allow for ADA compliance with the building being non-seismic.

The existing elevator has a manual door and manual gate assembly retrofitted with safety interlocks and gate switches. Current elevator systems use power operating sliding doors for accessibility compliance and ease of operation.

The current machine room is located under a stairwell and is 172” wide by 50” deep with a 35” width door. All existing equipment will need to be removed for the new controller and electrical disconnect, which can be placed in this existing space. Code requires a fire rated control space with temperature control as detailed in Appendix A - Related Work.

The current elevator serves five (5) floors has entrances at the basement, main floor, 2nd floor, 3rd floor and 4th(top) floor. There are four hoistway access doors in between these landings for maintenance and rescue purposes by qualified personnel in the event of an entrapment, as required by Code. New power operated doors and entrances will be installed at the existing five landings, some degree of customization is available for the location of the new entrances and additional stops, if necessary based on design goals, but the hoistway access doors are required.

Finally, a replacement of the elevator equipment will require some upgrades to existing building for Code compliance. There are some provisions within the elevator Code for the limitations of the existing structure. A summary of such work is defined in Appendix A – Related Work.

D. RECOMMENDATIONS

After the extensive survey and engineering, Lerch Bates recommends removing the existing elevator equipment and installing a new elevator system in its place. By Code, this is considered a new installation within an existing building and will require a structural engineer to confirm that the building can support the new elevator system and the associated loads.

The recommended elevator system for this building could be a custom gearless traction elevator that has a glass or metal mesh hoistway design to continue the current open design on site. The cab itself could be a combination of steel and glass to provide viewing out of the cab while it moves up the hoistway inside the Campanile. At each landing, a new enclosed entrance assembly and solid hoistway structure will be required to prevent access of any kind into the hoistway. Based on budget restrictions a standard style elevator could be used.

We advise engagement of a structural engineer as soon as possible to confirm that the existing steel beams can be used to support the new elevator system and hoistway structure. Additional intermediate structural supports will most likely be needed throughout the height of the hoistway, at the elevator pit and at the top of the hoistway to accommodate the different loads imposed by a traction elevator system. Vertical tube steel may be an option as it has been successfully used for this structural load requirement.

The new elevator system will have automatic push button operation, a microprocessor-based control system, automatic powered side slide door operation, and will meet all accessibility and modern Elevator

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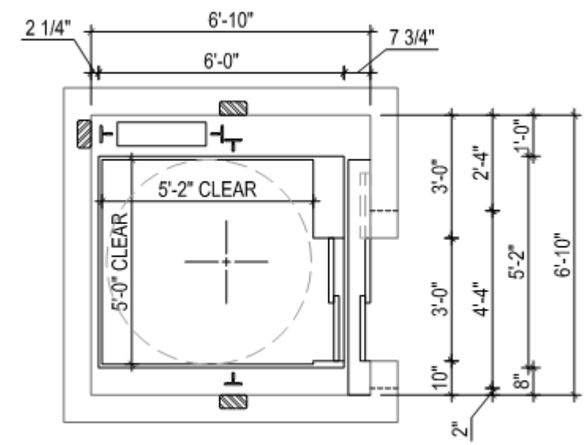
Code requirements. It will also be important for an engineer to confirm that the existing hoistway is plumb and doesn’t encroach inside the 6’-10” clear hoistway dimensions.

These dimensions allow for a 2100lb capacity elevator that will travel 200FPM. The required pit depth for this unit is 7’-0” and the required overhead height (measured from top landing floor to bottom of hoist beam at top of hoistway) is 18’-0”. These heights include an 8’-0” cab height. If you would like to revise the cab height, the overhead height will change accordingly. IE a 9’-0” cab height will require an 19’-0” overhead height.



Appendices to this report include:

Appendix A: RELATED WORK

- Detail of the building work required by Code as a part of the modernization.

Appendix B: ESTIMATED SCHEDULE

- Summary of the major milestone dates for the project.

Appendix C: PHOTOGRAPHS

- Supporting photographs with text explanation.

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APPENDIX A
RELATED WORK

A. Hoistway and Pit:
1. Clear, plumb, substantially flush hoistway structure with variations not to exceed 1" at any point.
2. Supports at each floor for car and counterweight guide rail fastening. Intermediate car guide rail support when floor heights exceed 14'-0" or as designated on manufacturer's drawings. Intermediate counterweight guide rail supports where floor heights exceed 16'-0". Building supports not to deflect in excess of 1/8" under normal conditions.
3. Wall blockouts and fire rated closure for control and signal fixture boxes which penetrate walls.
4. Cutting and patching walls and floors.
5. Structural slab, wall pockets, and/or structural steel beams for support of hoist machine, rope sheaves, and dead-end hitch beams. Support deflection shall not exceed 1/1666 of span under static load.
6. Erect front hoistway wall after elevator entrances are installed.
7. Grout floor up to hoistway sills may be required based on entrance type.
8. Lockable, self-closing, fire-rated pit door may be required based on pit depth/lowest landing.
9. Pit access ladder for the elevator. Retractable ladder if provided shall include an electrical contact conforming to ASME A17.1, Rule 2.2.2.4.2.7.
10. Structural support at pit floor for buffer impact loads, guide rail loads.
11. Waterproof pit. Indirect waste drain or sump with flush grate and pump. Sump pump/drain capacity minimum 3000 gallons per hour, per elevator.
12. Protect open hoistways and entrances during construction per OSHA Regulations.
13. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage.
14. Seal fireproofing to prevent flaking.
15. Glass enclosed hoistways or cabs; Laminated glass to meet the requirements of ANSI Z97.1. Interior ledges created by glass mullions in hoistway not to exceed 2".

B. Machine Room and Machinery/Control Spaces:
1. Enclosure with access.
2. Self-closing and locking access door.
3. Ventilation and heating. Maintain minimum temperature of 55° F, maximum 90° F. Maintain maximum 80% relative humidity, non-condensing.
4. Paint walls and ceiling.
5. Class "ABC" fire extinguisher in each elevator machine room.
6. Seal fireproofing to prevent flaking.

C. Electrical Service, Conductors, and Devices:
1. Lighting and GFCI convenience outlets in pit, machine room, and overhead machinery spaces. Provide one additional non-GFCI convenience outlet in pit for sump pump.
2. Three-phase mainline copper power feeder to terminals of each elevator controller in the machine room with protected lockable "open" disconnecting means. Disconnect handle to be within 18" of strike jamb and 66" above finished floor per MA Code

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3. Single-phase copper power feeder to each elevator controller for car lighting and exhaust blower with individual protected lockable "open" disconnecting means located in machine room.
4. Emergency telephone line to designated elevator control panel in elevator machine room.
5. Fire alarm initiating devices in each elevator lobby, for each group of elevators or single elevator and each machine room to initiate firefighters' return feature. Provide alarm initiating signal wiring from hoistway or machine room connection point to elevator controller terminals. Device in machine room and at top of hoistway to provide signal for general alarm and discrete signal for Phase II firefighters' operation.
6. Temporary power and illumination to install, test, and adjust elevator equipment.
7. Single-phase power feeder to each elevator controller in machine room with protected lockable "open" disconnecting means for car heating and air conditioning unit.

D. Standby Power Provision (If provided):
1. Standby power of normal voltage characteristics via normal electrical feeders to run one elevator at a time at full-rated car speed and capacity.
2. Conductor from auxiliary form "C" dry contacts, located in the standby power transfer switch to a designated elevator control panel. Provide a time delay of 30 - 45 seconds for pre-transfer signal in either direction.
3. Standby single-phase power to group controller, and each elevator controller for car lighting, exhaust blower, emergency signaling device.
4. Means for absorbing regenerated power during an overhauling load condition per NEC 620.91. Elevator will employ IGBT drive, presenting a non-linear active load.
5. Standby power to machine room ventilation or air conditioning.
6. Standby power to emergency communications device(s).
7. If standby power is not available, a battery evacuation system is recommended for this elevator system.
   a. The Main Disconnecting means must be equipped with Auxiliary Contact with wiring to the elevator controller in order for the elevator control system to differentiate between power outage and manually 'Open' disconnect (elevator power down).

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APPENDIX B
ESTIMATED SCHEDULE

Planning should include consideration of long lead times for fabrication of equipment and installation. Approximate time periods for the project are as follows.

PREPARATION OF BID SPECIFICATION/OWNER REVIEWS	3 WEEKS
CONTRACT/BID REVIEW AND AWARD OF CONTRACT	3-4 WEEKS
SHOP DRAWING APPROVAL	6 WEEKS
EQUIPMENT FABRICATION	16 WEEKS
EQUIPMENT DELIVERY	2 WEEKS
INSTALLATION	10 WEEKS
FINAL ADJUSTING AND TESTING	2 WEEKS
TOTAL ELAPSED TIME FOR PROJECT	43 WEEKS

Durations can vary by manufacturer. The bid documents will include solicitation of each contractor's time frames.

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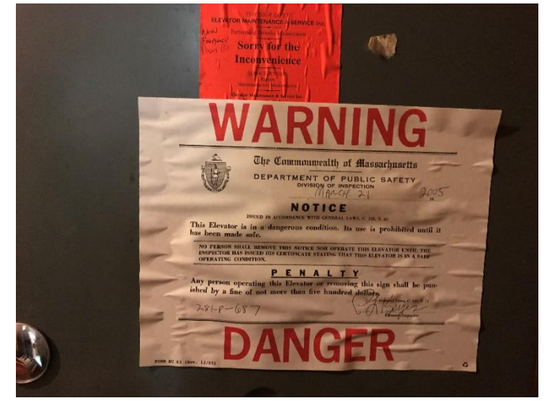
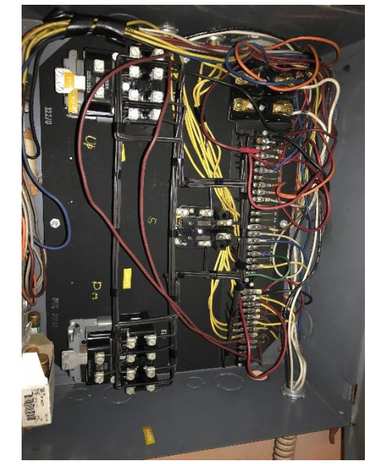
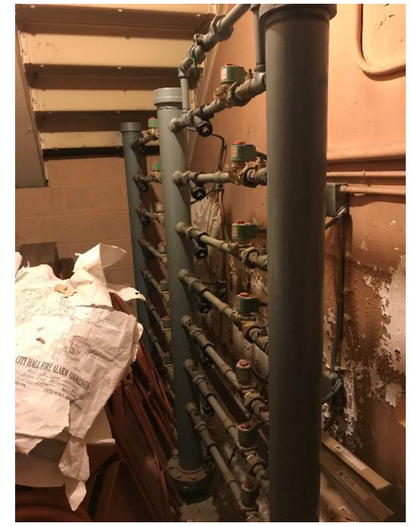
APPENDIX C
SUPPORTING PHOTOGRAPHS



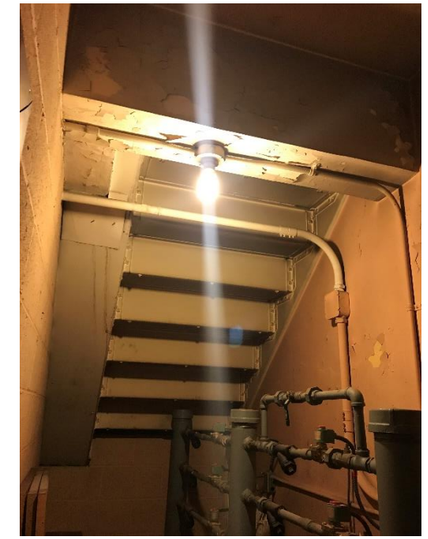
1. Decommission notice on Controller (March 21, 2005)



2. Inside of controller



3. Elevator piping and pressure valves in machine room



4. Non-compliant machine room lighting

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5. Elevator entrance at Basement level

6. Elevator threshold (car and hall sills, will be replaced)

7. Cab interior

8. Car operating panel – Car Switch Operation

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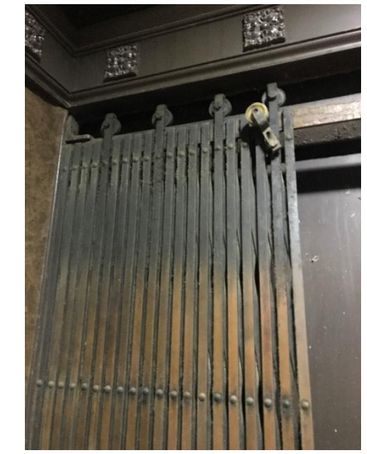
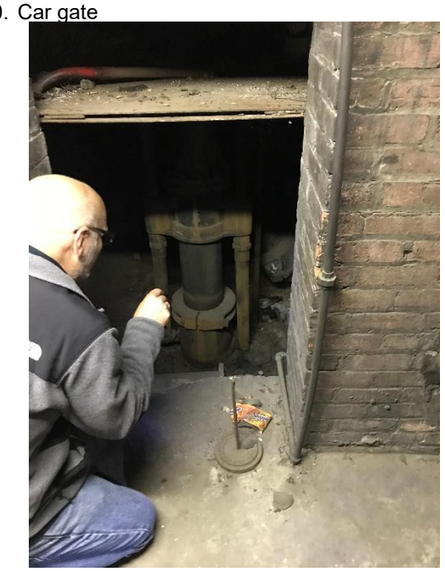
9. In car handset phone



10. Car gate

11. Water hydraulic piping and electrical conduit in pit



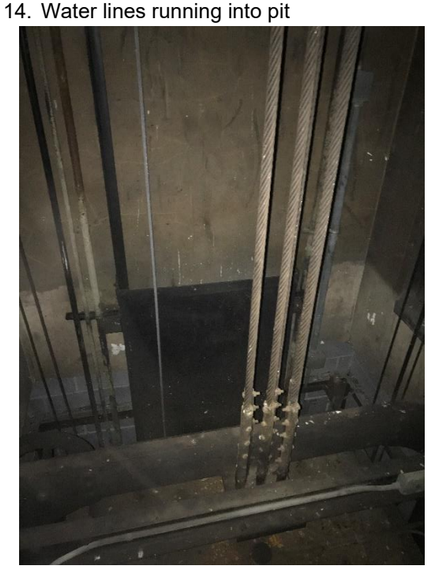
12. Telescopic water hydraulic piston in pit, false pit above.

© 2018 Lerch Bates Inc. V11

13. Water hydraulic piston head located in pit

14. Water lines running into pit

15. Cabled pulley system at back of pit



16. Counterweight located at rear of hoistway

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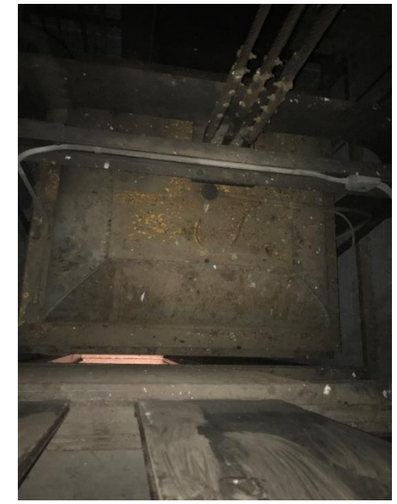
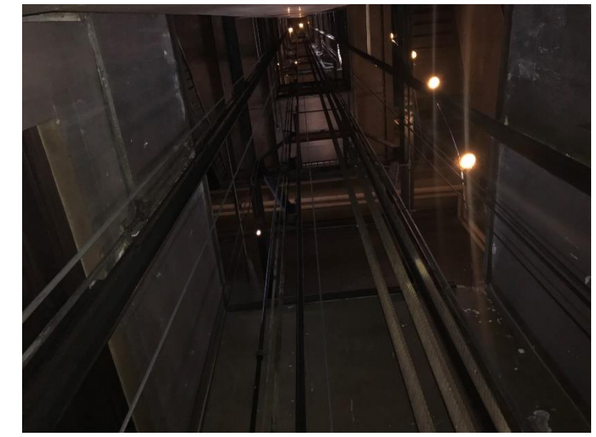
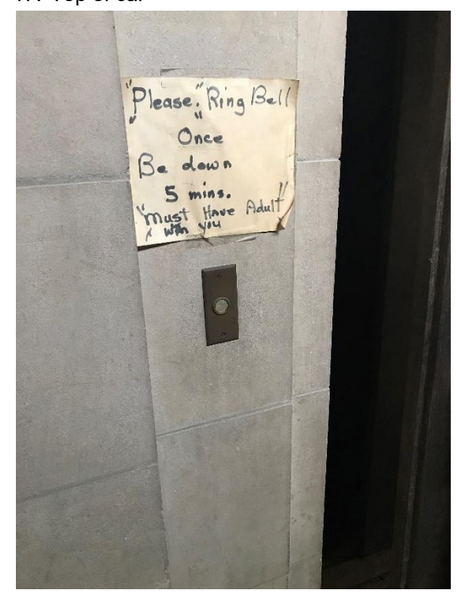


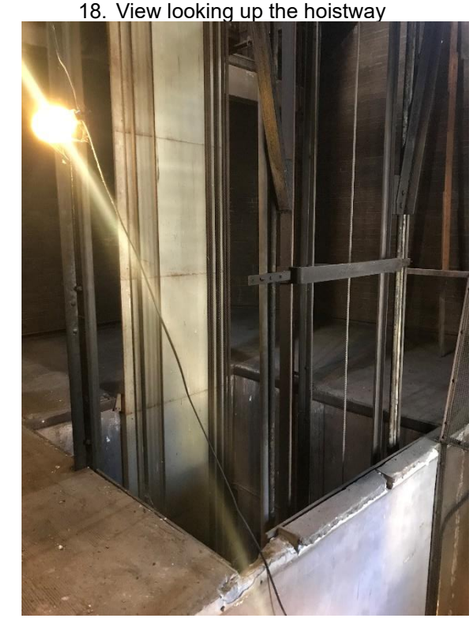
17. Top of car



18. View looking up the hoistway



19. Old bell call system



20. Hoistway above main landing

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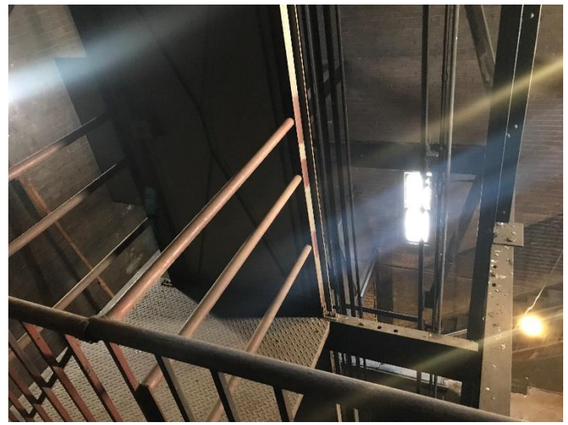
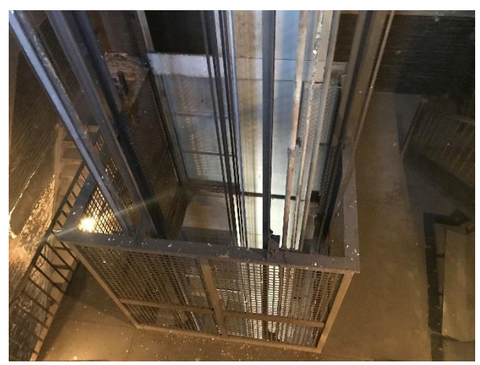
21. Hoistway & supplemental steel



22. Hoistway & access door

23. Entrance at floor 2



24. Hoistway

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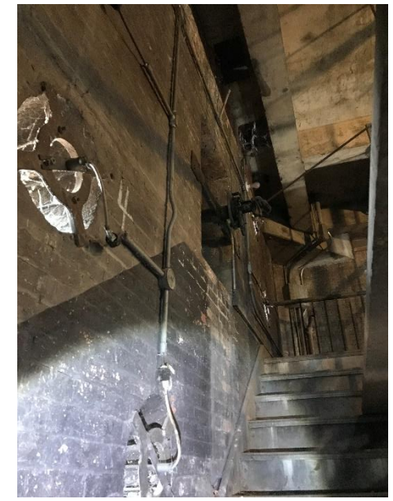
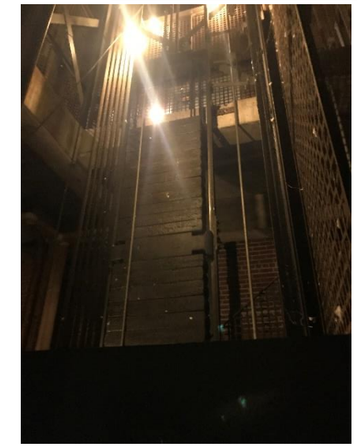
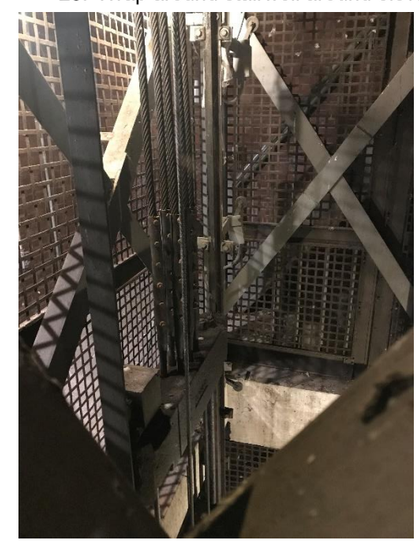


25. Wrap around stairwell around elevator



26. Counterweight



27. Hoist ropes and hoistway walls

28. Sheave at top of hoistway

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Preliminary Traction Elevator Power Data

Approval Copy Only
Date: 10/10/2019

Job Name: Springfield Campanile
Address: Springfield , Ma
Job Number: NHP222
Customer: Minnesota Elevator, Inc

Capacity: 2100#
Speed: 200 FPM
Travel: 110 ft

Supply Characteristics:
Voltage: 208
Phase: NA
Hertz: NA

Motor Voltage: 170
Motor Horse Power: 9.8
Motor Quantity: 1

Motor - Full Load Amps 28.333333333333
Accelerating Amps 56.7

Building Service:
Voltage fluctuation of the building service provided by the local utility shall be within +/- 10% of the specified supply voltage. Maximum phase fluctuation shall be +/- 3%.

Power Feeders:
In the machine room, provide a main power disconnect (with a dedicated earth ground) to supply power characteristics as shown per coded requirements, including a separate ground wire from disconnect to elevator controller.

Permissible Voltage Drop:
Not to exceed 3% under any condition in the feeders within the building from the building service provided by the local utility to the motor connection in our controllers.

Motor Rating:
9.8 Horse power elevator-type motor. This equipment is used for an intermittent elevator duty cycle. Requirements of the National Electric Code (NEC) for a 60 minute motor may be used for sizing conductors provided the permissible line drop in preceding paragraph is not exceeded.

Electrical Current Values:
Not to exceed 3% under any condition in the feeders within the building from the building service provided by the local utility to the motor connection in our controllers.

Convenience Features:
Provide a separate car lighting supply, with a lockable disconnect and separate branch circuit per code 120 VAC 15 AMP to machine room to be located near or on the elevator controller panel.

Provide a separate 120 VAC 20 AMP circuit with light receptacle, light switch, and GFI outlet in elevator pit.

Provide light fixture and telephone receptacle for each elevator, in the machine room, connected to controller.

Provide smoke sensors at each floor landing and in the elevator machine room.

Heating and Cooling:
Means must be provided to maintain the machine room temperature between 55 Degrees Fahrenheit and 90 Degrees Fahrenheit Relative humidity not to exceed 85%. BTU/hr output at maximum runtime: 6,715
Heat output in hoistway is 1248 BTU/hr.

Emergency Lowering - NA

Oil Cooler - NA

Tank Heater - NA

Clock and Carrilon

Verdin Bells & Clocks

444 Reading Road
Cincinnati, OH 45202

Project Team:

Bob Verdin

- Chime and Tower Clock Proposal
- Chime and Tower Clock Inspections and Findings
- Fabrication of Bells and Automatic Bell Ringing Equipment
- Design, Development, and Fabrication Agreement

VERDIN
175 YEARS
SINCE 1842

Dear Mr. Guditz,

The Verdin Company is pleased to summit our recommendation and proposal for the renovation of the Springfield City Hall Chime and Tower Clock.

The evaluation of the chime and Tower Clock was done on October 25, 2018 by Robert Verdin III Vice President of Sales and Jeff Lewis Eastern Sales Manager.

History:

The cast bell chime was installed in 1913 by the Meneely Bell Foundry in Troy, New York. The Chime consist of twelve (12) bells ranging from 3000 pound D# to a 200 pound A#. According to the Verdin records and the site visit on October 25, 2018 the bells are not a tuned set. This would mean that the bells are not of an exact pitch. This is common for bells cast in the early 1900's. The Verdin Company has given several quoted to the City for the replacement of this set of bell for a Carillon pitch tuned to A 440.

Chime Findings:

The bells are in good condition. The steel support frame and the strikers and controls are in poor to bad condition. The Verdin Company would recommend the replacement of both. The steel frame shows lots of corrosion and even some delamination were the steel beam attach to the building.

Chime Recommendations:

Remove all twelve bells from the tower. Remove the existing steel bell frame and replace with new. The new bell frame will be of a simple standalone design. The frame will not connect to the building like the existing. The Verdin Company will design, build and install the new bell frame. The bells will be installed in the new frame with all new stainless steel support bolts. All new Verdin outside (VO) strikers will be install at each bell. The strikers will be mounted to the inside of the bell frame so they will not be seem from the ground. By having the striker on the outside of the bell makes for an easier and safer access to service. The new VO strikers will be controlled from the Verdin Carillon Master Control System.

Bell Tuning:

The Meneely Bell Foundry was known for casting many beautiful chime all across the United Sates. Many of these chimes are not what you would call today, a perfectly tuned set of bells. Meneely did not tune start tuning bells until the 1920 or 30's. Even then the tuning was not perfect. The bells are out of tune but so are many of the chimes across the United States. It is possible to make some improvements to the bells to make them sound more in tune. It is not possible to make them perfect.

The Verdin is providing an option for the tuning of the existing set of bells as an option in the proposal for Chime Renovation.

Tower Clock Findings:

The old E. Howard Timepiece has not had any service in years, it has missing parts and has parts that need to be replaced. Any restoration of this E. Howard timepiece would have to be done in our factory in Cincinnati..

Tower Clock Recommendations:

The Verdin Company recommends the updating of the existing E. Howard timepiece with a new modern self-correcting timepiece.

The Verdin Company is providing a proposal for the updating of the Tower Clock Movements with new Clock Hands

History:

The cast bell chime was installed in 1913 by the Meneely Bell Foundry in Troy, New York. The Chime consists of twelve (12) bells ranging from 3000 pound D# to a 200 pound A#. According to the Verdin records and the site visit on October 25, 2018 the bells are not a tuned set. This would mean that the bells are not of an exact pitch. This is common for bells cast in the early 1900's.

Chime Findings:

The bells are in good condition. The steel support frame, strikers and controls are in poor to bad condition. The Verdin Company would recommend the replacement of all. The steel frame shows lots of corrosion and even some delamination were the steel beams attach to the building. This is causing the building to crack lends concern to the structural stability of not only the steel chime frame but the building.

The vibration of the bells may also be a contributing factor of the cracking of the building. As the bells are stuck they vibrate to the steel beams they are attached to. Over time this vibration can cause damage.

See pictures of the steel frame connection point to the building. You will also see the delamination of the steel beams.

In these two pictures we see that the beam to the left is starting to show the delamination of the steel. This is the cause of the cracking we see along with the vibration of the bells.

The bell support bolt on the right is also showing how the steel is pushing apart from the rusting (delamination) of the steel.

This picture shows the top of the bell and the bottom side of the beam the bell is attached to. In this picture you can see the severe rusting of the steel.

Bell support beams

Bell support bolts

Bell mountings

The Verdin Company Proposal

for:

Fabrication of
Bells and Automatic Bell Ringing Equipment

City of Springfield - Campanile Tower
Springfield, MA

January 4, 2019

Submitted by
Robert Verdin, III
Jeff Lewis

FABRICATION AGREEMENT FOR
AUTOMATIC BELL RINGING EQUIPMENT

This Fabrication Agreement (this "Agreement") is made and effective this 4th day of January, 2019 (the Effective Date) by and between THE VERDIN COMPANY, an Ohio corporation located at 444 Reading Road, Cincinnati, Ohio 45202 ("Verdin") and **City of Springfield - Campanile Tower, Springfield, MA** ("Purchaser").

CAST BRONZE BELLS: The customer has twelve existing cast bronze bells in a tower. The following proposal references new bell ringing equipment for said bells.

BELL HARDWARE: The following bell hardware will be provided for the bells listed above.

Bell Frame: Verdin will supply and install a structural steel bell frame of bolted and welded construction. This frame will be suitable for the suspension of the above mentioned bells in a stationary configuration, and will be constructed to accommodate all static and dynamic loads imposed by the bells and related hardware with minimal deflection.

The frame shall be substantial, rigid and properly braced so that steel members do not block the sound from the bells. The steel members, including bolts and nuts, will be finished in acrylic urethane type paint for superior corrosion protection. Special attention will be given to the design of the frame to insure proper cross bracing and beam sizes to properly support the bells when rung. The best and most appropriate isolation material will be used to isolate all bells from the steel framework.

Galvanizing the Bell Frame: Verdin will hot dipped galvanized the steel bell frame.

Support Bolts: All bells will be supported with Stainless Steel support bolts. Each bell bolt will be sized according to the weight of the bell.

MECHANICAL BELL RINGING EQUIPMENT

VO Bell Striker Unit: Twelve (12) VO Bell Striker Units will be provided for the bells described above.

The Verdin VO bell striker unit is custom designed to ring a bell that is mounted in a stationary position, with the striker housed on the outside of the bell to be rung. The frame is made of steel with the clapper ball fabricated of mild steel for optimum quality and richness of tone. The clapper ball and stem are constructed with proper weight and dimensions as determined by the bell. The clapper pivot is bushed with nylon igus type bearings. The clapper is operated by electromagnetic coils that operate on a nominal voltage of 240 volts DC, which is furnished by an associated driver board. The magnetic coil is wound with copper wire, wrapped in a special tape and coated with an electrical resin. The VI bell striker is treated with yellow zinc chromate plating and then finished with an exterior grade, satin black powder coating. This double protection against corrosion will give the striker a long life.

DIGITAL BELL RINGING CONTROLLER – Verdin shall provide an electronic bell controller. This electronic device will be the primary user interface and will allow simple and reliable operation of your bell system. Each digital bell ringing controller is specifically configured to properly operate the bells and bell ringing equipment as listed above.

Carillon Master Control System: The Verdin Carillon Master Control System is a solid-state digital control system utilizing state-or-the-art electronic technology. The Carillon master provides unmatched, simplified scheduling functions, and the widest-range of bell-ringing features available in the industry. The Carillon Master offers the following industry leading features.

A. Large self-lighted display screen enables simple and intuitive operation utilizing easy to follow menu screens.
B. Non-volatile FLASH memory; 10-year battery back-up for clock setting.
C. Automatic Daylight Savings Time reset.
D. Automatic Season adjustments, plus you have the ability to create and add your own holidays or seasons.
E. Verdin will provide with this system, bell samples of the bells in the tower that are in the exact musical range for monitoring. These may also be used as a practice instrument by turning off the tower bells.
F. While recording, the outside cast bells can be turned off and the carillonneur can listen to the sampler bell sounds through a monitor speaker provided by Verdin.
G. A console monitor speaker with volume control for practicing the digital bells.
H. Security password to control access to the unit.
I. Quick play instantly, from the main menu screen, computer, or remote.
J. A counted Hymn Player.
K. Instant Play Wireless Remote Control. No other system on the market today has a remote control that allows you to play any musical selection in the carillon's memory instantly and live.
L. Three ways to operate/schedule the Carillon Master, live and in real time; the console, directly connect your computer to the Carillon Master or through your local area network, and instantly through the wireless remote control.
M. A 5-octave detachable keyboard will be provided to be used for live play or the recording of custom music selections and can also be used as a practice instrument.
N. The Carillon Master will be prepackaged with a wide range of bells, peals and tolls and carillon bell music (songs, hymns and carols). A standard music package combines religious music, with seasonal and patriotic selections. The Carillon Master can contain up to 1,000 music selections. The Carillon Master will come with pre-programmed music to fit your specific chime or carillon. The system will come with the following:

1. Swinging Bell Ringing – Call to Worship.
2. Wedding or Celebration Peals of Swinging Bells.
3. Westminster Chimes, as well as many more.
4. Time Strike – Hour, Half-Hour or Quarter Hour – Your Option.
5. Tolls – Funeral Toll, Counted Toll, and Instant Toll.
6. Liturgical bells – two, three, four, or six simultaneously swinging bells.

7. Ability to schedule by typical week, day, date, season/holiday, or event.
8. Ability to upgrade Program Library.

O. The Display and Control Keys. The Verdin Carillon Master features a large 9" color touch display for easy viewing. All scheduling of the chime/carillon (setting the clock, user programming, etc.) is accomplished using only the menu screen. This eliminates confusion associated with abbreviated character displays or small two line displays.
P. The Real-Time Clock and Battery Backup. The system clock consists of a quartz-controlled clock-calendar circuit whose display is in 24-hour time format. Its display shows accuracy to the second. The clock is easily set by the user. The carillon is accompanied by a lithium battery, which will power the clock in the event of a power outage. The battery has an expected life of ten (10) years.
Q. The Program Memory. The user program is stored in FLASH RAM memory and is not dependent on the clock battery for maintaining the program in the event of a power outage.
R. Power Sources. All the DC voltages required by the controller are generated within it. In addition, if there is an interruption in power to the system, the battery back u will forward the clock to the current time when power is restored.
S. Computer Interface. This Carillon Master configuration includes the Computer/Local Area Network Interface. This interface allows complete control of quick play, scheduling, and all other operations of the Carillon Master by computer. Directly connect a computer to the Ethernet connection on the Carillon Master and play any pre-recorded carillon music or bell function instantly and live from the computer or directly schedule programs and events instantly and live. Or, connect the Carillon Master directly to a Local Area Network via the Ethernet connection and operate the carillon remotely by any computer also connected to the local area network.

A. Interface: The interface is necessary for the conversion of low voltage triggers to operate high voltage equipment.

TERMS & CONDITIONS

1. **Installation of the Bell Ringing Equipment**. Verdin and/or representatives of Verdin will install the bell ringing equipment included in this Agreement at the job site on a date agreed to by the parties. Verdin shall provide the labor, tools, and equipment necessary to complete the installation. All workmen employed or engaged by Verdin to perform the installation are covered by property damage and public liability insurance. If any portion of the bell ringing equipment cannot be installed on the installation date for any reason other than the failure of Verdin to supply the bell and related components in accordance with the terms of this Agreement, Purchaser shall be responsible for paying any additional costs or expenses incurred by Verdin resulting from such delay, including without limitation, the fees or wages of Verdin's installation representatives, equipment rental costs, storage costs, or mobilization costs at the job site.

2. **Limited Warranty**. Verdin warrants the Bell Ringing Equipment to be free from defects in materials and workmanship for the periods shown below after the date of installation, provided the Bell Ringing Equipment and it components are maintained in accordance with instructions provided by Verdin. To the extent permitted by applicable law, for each product, Purchaser's exclusive remedy and Verdin's exclusive liability for any loss, damage, or destruction resulting from any non-conformity of any shipment made by Verdin to Purchaser under this Agreement of from any defects in the Bell Ringing Equipment within the warranty period will be limited strictly to the repair or replacement, at Verdin's discretion, of any nonconforming or defective materials upon examination of such by Verdin. Verdin shall have a reasonable time to repair or replace any nonconforming materials, including the time for the manufacture of replacement of such materials. THIS WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

   a. Bell Ringing Equipment: 3 years

3. **Purchaser Responsibilities**. Purchaser shall provide at its own expense the items and services listed below in connection with the installation of the Bell Ringing Equipment.

   a. **Electrical Wiring**. Purchaser will be responsible for providing all electrical wiring and conduit (including all final connections to tower base, striker leads, mounting of electrical panels, or splicing of wires) from a source designated by the Purchaser and in accordance with specifications provided by Verdin.
   b. **Cranes, Hoists, Man-Lifts**. Purchaser will provide all necessary cranes, hoists, or lifts (including the operators of such equipment) that are required to (i) offload the equipment from the delivery vehicle; (ii) move the equipment to the designated site where it will be stored until such time as the installation is scheduled to take place; and (iii) complete the installation.
   c. **Licenses/Permits**. Purchaser will obtain at its expense any necessary licenses, permits, or engineering stamps for the construction and installation of the outlined equipment
   d. **Access to Job Site**. Purchaser will arrange to provide sufficient access to the job site to enable Verdin to install the outlined equipment.

4. **No Liability for Damages**. TO THE EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL VERDIN BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING, WITHOUT LIMITATION, DAMAGES FOR ECONOMIC LOSS OR LOSS OF PROFITS SUFFERED OR INCURRED BY PURCHASER IN CONNECTION WITH ANY BREACH OF THIS AGREEMENT BY VERDIN EVEN IF PURCHASER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

5. **Liability for Negligence**. Neither party shall be responsible for personal injury or property damage or loss except that resulting from its own negligence or the negligence of those within its control or employ.

6. **Freight**. The Verdin Company will be responsible for the freight charges of the Bell Ringing Equipment to the jobsite.

7. **Delivery.** Upon receipt of order, down payment in accordance with the terms delineated below and approved shop drawings, the above listed equipment shall be shipped within 120 to 160 days.

8. **Payment Terms**. **The total Purchase Price for the Bell Ringing Equipment shall be $135,850.00** (excluding taxes), and shall be paid to Verdin in U.S. Dollars in accordance with the following schedule:

    a. $67,925.00 upon the execution of this Agreement.
    b. $67,925.00 upon shipment to the jobsite.

9. **Change Orders**. Verdin, in its discretion, may accept any additions, deletions, or changes to this Agreement without invalidating this Agreement, provided that all such changes are authorized by a written amended purchase order signed by Purchaser and Verdin (the "Change Order"). Such Change Order shall specify any additional charges (or credits) to the Customer and the payment terms for such charges. The Change Order shall become effective only upon acceptance by Verdin.

10. **Force Majeure.** To the extent permitted by applicable law, Verdin shall not be liable for any loss or damage, including consequential loss, from the failure wholly or in part to fulfill the terms of this Agreement by reason force majeure, including labor strike, lock-out, trade dispute, fire, drought, flood, bad weather, interruption of transport, restriction by Government or other competent authority, destruction of premises, plant or machinery failure, shortage of power supplies, or inability to obtain adequate supplies.

11. **Governing Law**. The parties agree that any dispute or default arising from this Agreement shall be governed by the laws of the State of Ohio.

12. **Entire Agreement**. This Agreement constitutes the entire understanding between the parties and supersedes all prior negotiations or representations, either written or oral.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed on the date first above written.

The Verdin Company	**City of Springfield - Campanile Tower Springfield, MA**
_____	_____
By: Robert Verdin, III Vice President of Sales	By: (print name)
	_____ (Signature)
	Title:_____
	Date Accepted:_____

PROPOSED

TOWER CLOCK MOVEMENTS

DESIGN, DEVELOPMENT, AND FABRICATION AGREEMENT

FOR

CITY OF SPRINGFIELD-CAMPANILE TOWER
SPRINGFIELD, MA

JANUARY 4, 2019

SUBMITTED BY
ROBERT VERDIN
AND
JEFF LEWIS

VERDIN
SINCE 1842
BELLS • CARILLONS • CLOCKS

CITY OF SPRINGFIELD CAMPANILE TOWER – TIMEPIECE

The Verdin Company is pleased to submit this proposal and scope of work for the installation of tower clocks. As America's most experienced tower clock manufacturer, operated and managed by the Verdin family for over 175 years, The Verdin Company is uniquely qualified to provide **Customer Name** with the finest and most accurate tower clocks in the industry.

Verdin installed its first product, a tower clock, in 1842 at Old St. Mary's Church in Cincinnati, Ohio. When Francois de Sales Verdin, one of the original founders, turned the business over to his son, Alois Nicholas Verdin, he began a 166-year tradition of successfully passing the business from one generation to the next.

Five generations of Verdin family members have been dedicated to creating the finest bells, clocks and carillons that have become cherished legacies for years to come. This experience has been gained from the more than 30,000 installation throughout North America; and the understanding of customer requirements, how our products are utilized, and the value our customers place on the tower clocks. We are responsible and accountable directly to our customers. Verdin manufactures, sells, and services its products directly, never through dealers or third party resellers.

Verdin has distinguished itself by blending innovative technology with superior customer service. Creating fine timepieces has been the hallmark of Verdin's clock business since the company's founding in 1842. Clocks are individually designed and built to meet every customer's specific desire.

If you've noticed a magnificent timepiece gracing a city square, courthouse, university or business center, there's a good chance it has a Verdin name on it. Verdin builds and installs clocks in airports, amusement parks, churches, hotels, restaurants, freestanding towers and shopping centers. Clocks add elegance and stature to any building or tower.

What Makes a Verdin Clock Better?

- Verdin clocks are built in our factory by skilled technicians and craftsmen who have accrued decades of experience.
- Verdin clocks are waterproof and windproof and are built to withstand extreme climate conditions.
- Verdin clocks conform to ANSI/UL standards and come with optional preventative maintenance assurance that other companies do not offer.
- Verdin's durable timepieces are accurate to within one minute per year.
- Verdin backlighting is the highest quality in the industry. Verdin clocks light up like a full moon – never any shadows.
- Verdin clock hands are made with special reinforcements not found in other clocks, ensuring quality, long-term operation.
- Verdin's factory-trained installation and service teams are unparalleled in the industry.

DESIGN, DEVELOPMENT, AND FABRICATION AGREEMENT

This Design, Development, and Fabrication Agreement for one (4) timepiece and hands for the existing tower clocks at City of Springfield Springfield, MA (this "Agreement") is made and effective _____ by and between THE VERDIN COMPANY, an Ohio corporation located at 444 Reading Road, Cincinnati, Ohio 45202 ("Verdin") and awarded contractor_____ for the City of Springfield Springfield, MA ("Purchaser").

Timepiece with Hands. Verdin Clock Equipment, for four (4) timepiece and hands for the existing tower clock, will be constructed in the following manner:

1. Clock Hands. Each pair of clock hands will be precision cut from a composite material measuring 3-4 millimeters in thickness containing two sheets of .012" aluminum over a thermoplastic core. The composite material is pre-painted with a highly durable, black polyester finish designed to provide years of maintenance free beauty. Each hand will be mounted to an appropriately sized cast aluminum hub that has been machined and bored to perfectly fit its respective movement shaft. In addition each overall hand will be meticulously balanced to ensure long movement life. Hand style may be chosen from any of Verdin's standard hand styles below:

2. Clock Movement. **Heavy-duty pulse type clock movement** will be provided. The movement will be driven by a synchronous, totally enclosed, high torque, hysteresis type motor. All parts of the motor drive systems will utilize corrosion-free gearing and self lubricating type bearings. The modern design of the Verdin movement provides for long life and virtually maintenance free operation. Verdin clock movements are extremely accurate and are not subject to frequency variations of the incoming line.

3. The Verdin Compact Master Clock Controller. This controller features solid-state design that can withstand a wide range of temperature changes and **maintain accuracy within 1 minute per year**. The controller will operate pulse-driven or synchronous movements.
This controller has a back up battery system to maintain internal time keeping and clock hands position in the event of a loss of AC power. Upon resumption of power, the Master Clock Controller will automatically reset the clock hands to the correct time. The battery has a 10-year life expectancy.

Features:

- 100 year almanac
- Operates in all temperature environments
- Automatic Daylight Savings Time change
- Easy Mounting – Compact Size 7" x 7" x 3"
- Operates Standard 120v – 60Hz
- Battery backup - 10 Year Battery Life
- Perpetual clock
- Menu driven programming
- Fully automatic power return
- Safety locks
- Automatic Power Failure Recovery
- Instruction Manual

Delivery. Verdin will select and contract a carrier for transportation of the Tower Clock Equipment and all components thereof to the jobsite. Upon receipt of order, down payment in accordance with terms delineated below and customer approved shop drawings, the above listed equipment shall be shipped in 90-120 days. Transportation costs are included in the total pricing listed below.

Verdin Installation. Verdin shall provide the labor and equipment necessary to complete installation, complete programming for all electronic control Products supplied by Verdin; and perform a final check-off of all Products to confirm proper working order; provided, however, that Purchaser shall provide at its own expense Purchaser Installation Responsibilities below.

Purchaser Installation Responsibilities. Purchaser shall be responsible for providing at its own expense the following items and services required to perform the installation: (i) off-loading and safe storage of the Products at the Job Site; (ii) sufficient access (exterior or interior) to the area in which the Products will be installed, including safe ladders or lift equipment; (iii) construction of any platforms, bracing, or other support required to safely secure the area in which the Products will be installed; (iv) removal of any debris at the Job Site that could interfere with the installation; (v) any cranes, lifts, or hoists required to move or install the Products at the Job Site; (vi) all necessary electrical wiring in accordance with specifications furnished by Verdin, including all final connections to terminal strips, striker leads, mounting of electrical panels, or splicing of wires; (vii) any permits, licenses, or stamps of engineering approval; (viii) any necessary civil, structural, or electrical engineering services.; (ix) all necessary labor, tools, and equipment to perform the installation; (x) all preparatory and clean-up work at the job site; and (xi) any clock dial glazing repair or replacement.

Limited Warranty. Verdin warrants the Tower Clock Products to be free from defects in materials and workmanship for the periods shown below after the date of installation, provided the Tower Clock and it components are maintained in accordance with instructions provided by Verdin. To the extent permitted by applicable law, for each product, Purchaser's exclusive remedy and Verdin's exclusive liability for any loss, damage, or destruction resulting from any non-conformity of any shipment made by Verdin to Purchaser under this Agreement from any defects in the Tower Clock within the warranty period will be limited strictly to the repair or replacement, at Verdin's discretion, of any nonconforming or defective materials upon examination of such by Verdin. Verdin shall have a reasonable time to repair or replace any nonconforming materials, including the time for the manufacture of replacement of such materials. THIS WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

Tower Clock: **3 years**
Master Clock Controller: **3 years**

No Liability for Damages. TO THE EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL VERDIN BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING, WITHOUT LIMITATION,

DAMAGES FOR ECONOMIC LOSS OR LOSS OF PROFITS SUFFERED OR INCURRED BY PURCHASER IN CONNECTION WITH ANY BREACH OF THIS AGREEMENT BY VERDIN EVEN IF PURCHASER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Liability for Negligence. Neither party shall be responsible for personal injury or property damage or loss except that resulting from its own negligence or the negligence of those within its control or employ.

Change Orders. Verdin, in its discretion, may accept any additions, deletions, or changes to this Agreement without invalidating this Agreement, provided that all such changes are authorized by a written amended purchase order signed by Purchaser and Verdin (the "Change Order"). Such Change Order shall specify any additional charges (or credits) to the Customer and the payment terms for such charges. The Change Order shall become effective only upon acceptance by Verdin.

Governing Law. The parties agree that any dispute or default arising from this Agreement shall be governed by the laws of the State of Ohio.

Pricing. The Verdin Company offers bidders for the Customer Name, City, State all of the equipment and services, including transportation and handling, for the one (1) timepiece and hands for the existing tower clock at City of Springfield, as described above, for a total of:

$65,400.00

Payment terms are as follows: **$32,700.00** Deposit with Order
$32,700.00 Upon Delivery of Equipment

Offer Term. This offer is valid and in effect for 120 days from the date of offer below.

Respectfully Offered,

Date

_____
Robert Verdin

The Verdin Company
Cincinnati, OH

Accepted by,

Date:_____

_____

Title:_____

Company _____
City, State_____

Interior Finishes

Bruner/Cott Architects

225 Friend Street, Suite 701
Boston, MA 02114

Project Team:

Kenneth Guditz AIA
Mason Sanders

Bruner/Cott
ARCHITECTS
225 Friend St., Suite 701
Boston, MA 02114
617.492.8400
www.brunercott.com

Memorandum

From:	Kenneth Guditz, AIA	**Date:**	November 6, 2019
Project:	18.016 – Springfield Campanile		
Re:	Existing Architectural Finishes Conditions		

Introduction

Within the Campanile, the architectural finishes are very utilitarian in nature, except for the now-closed First Floor/Plaza Level Main Lobby with its limestone clad walls, mosaic tile floor, Guastavino tile vaulted ceiling and clear finished interior millwork doors and panels. The main lobby of the Campanile is historically accessed from either Court Street or the rear parking area via stairs to the plaza and entered through three sets of cast bronze bas-relief paneled doors on the southeast, northeast and southwest facades. Due to public safety concerns from falling stone and/or terra cotta fragments from above, the stairs at the access points from Court Street and the parking area are fenced-off and closed to the public. Secondary access to the Main Lobby by authorized personnel is by the service stair from the Ground Floor/Basement Level that connects to City Hall, Symphony Hall and the rear parking area. The Ground Floor/Basement Level has two accessible entrances from the rear parking area and provides access to the lowest elevator landing entrance. From behind the Main Lobby, the service stair winds up through the Campanile to the Upper Observation Level/Sixth Floor.

Architectural Finishes Conditions

Sub-Basement

Description: The existing service level finishes remain largely intact and are primarily exposed board-formed concrete and brick masonry walls, an exposed concrete floor and overhead concrete structure/slab construction. This level provides access to the elevator pit and associated water hydraulic piping and controls.

Elevator Pit Access Opening (at Right)

Ground Floor/Basement Level

Description: Two accessible entrances from the rear parking area are on opposite sides of the exterior stair to the upper plaza level lead to the Lower Lobby elevator entrance as well as connecting to the lower levels of City Hall and Symphony Hall. The original architectural finishes are largely intact and are derived from this level's service-related function rather than as a primary public entrance and circulation path. Over time, surface mounted electrical conduit and fixtures have been affixed to the walls and ceilings. The electronic keyboard for the operation of the chimes is in small room under the service stair to the First Floor along with some of the elevator controls.

Floor: Painted concrete with scoring joints to resemble stone in good condition with areas of minor deterioration and staining with stone thresholds at cased openings and doors to adjacent spaces. The two entrance vestibules are currently covered with entrance mat type material, presumably over painted concrete floors as in other areas.

Walls/Base: Primarily painted plaster in fair condition with localized areas of water damage requiring repair and/or peeling paint. Existing base material varies by location from original stone with stone plinths at millwork-trimmed cased openings and doors to projecting painted plaster at areas which appear to have been repaired in the past. The areas of original stone base are largely intact and in fair/good condition with localized areas of heavy staining and minor chipping.

Ceiling: Primarily painted plaster in fair/good condition with localized areas of water damage requiring repair and/or peeling paint. Some plaster ceilings in adjacent rooms in the connectors to City Hall and Symphony Hall have significant water damage and/or have been removed.

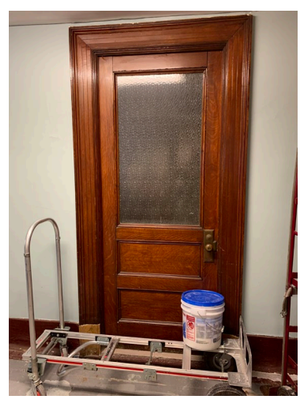
Millwork: Clear finished oak stile and rail/paneled interior doors and door/cased opening surrounds are largely intact and in good condition with original brass hardware. Select doors have patterned/textured glass vision panels in the upper portions of the doors. The two exterior entrance doors from the rear parking area appear to have been replaced and are fitted with exit devices and closers.

Lighting: Surface mounted fluorescent light fixtures and exit signs with exposed surfaced mounted conduit have replaced the original light fixtures.

Fittings: Existing wall-mounted painted cast iron steam radiators remain intact and are currently functioning.

Ancillary service closets and storage rooms off the primary Lower Lobby have a variety of utilitarian finishes such as painted brick and/or concrete walls, unfinished concrete floors and exposed overhead construction.

Entrance from Rear Parking Area


Typical Interior Wood Door

First Floor/Plaza Level

Description: A small but richly detailed limestone Main Lobby with a high vaulted Guastavino tiled ceiling, tessellated mosaic floor and a carved stone dedicatory for the commission that brought the new Municipal Group to replace the earlier city hall that burned in 1905. Clear finished oak paneled/glazed stile and rail interior doors lead to the rear service stair and at recessed panels at the two sides of the elevator shaft. The original matching millwork recessed panel elevator entrance doors have been removed and replaced with flush metal doors but remain for possible reuse. Decorative bronze wall sconce fixtures flank the Court Street set of cast bronze bas-relief paneled exterior entrance doors.

Main Lobby

Floor: Two color hand-laid stone mosaic tile in light colored large panels with dark colored surround/border is intact and in good condition but heavily soiled.

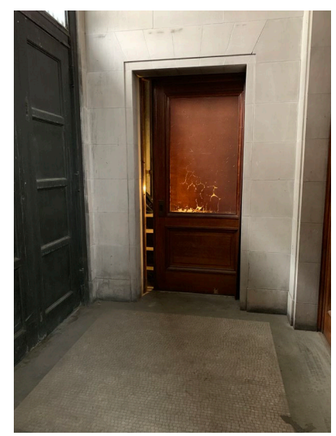
Wall and Base: Limestone with flat classical pilasters and jack/flat arches at door and elevator openings with a tall integral shallow projecting base with rectilinear edges is intact and in very good condition with heavily soiled areas.

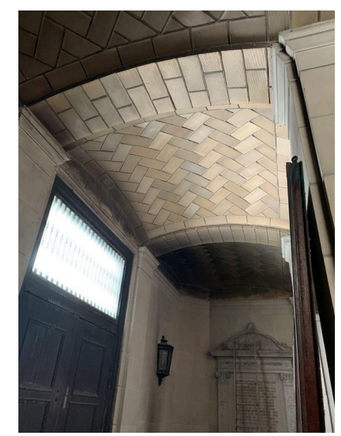
Ceiling: Ribbed Guastavino tile arches and vaults is intact and in very good condition, including mortar joints with localized areas of heavy dust/dirt accumulation.

Millwork: Two clear finished oak stile and rail/paneled interior sliding doors with back-painted glazed panels lead to the rear service stair area are intact and in good condition with original brass hardware. Two sets of clear finished oak stile and rail panels set into deep limestone surrounds at the sides of the elevator shaft are intact and in good condition. The original matching paneled millwork elevator entrance doors have been removed and replaced with flush metal doors but remain in the Main Lobby.

Exterior Entrance Doors: Three pairs of cast bronze bas-relief paneled doors and clear glazed transom with cast bronze exterior grille remain intact and in good condition but not functioning.

Lighting: A pair of original decorative bronze wall sconces flank the Court Street entrance doors are intact and do not appear to be functioning.


Main Lobby


Guastavino Tile Ceiling

Recessed Millwork Elevator Panel

Replacement Elevator Entrance Door

Service Stair

The service stair located off the rear of the Main Lobby has utilitarian level finishes such as exposed and/or painted brick and limited painted plaster walls, exposed concrete floor and painted steel stair stringers and railings with cast iron treads. Overall condition is good but heavily soiled.

Second, Third and Fourth Floors

Description: These intermediate floors have a full floor slab construction and are located above the Main Lobby and below the Lower Observation Level/Fifth Floor. The interior open stair of painted steel stringers and railings with cast iron treads winds around the interior face of the exterior wall with numerous intermediate landings between floors. The open elevator shaft extends up through the center of the interior stair. Elevator stops are provided at each of these floors with a partial height (8'-0" +/-) painted metal hoist way enclosure with a solid front and entrance door and open mesh sides and back.

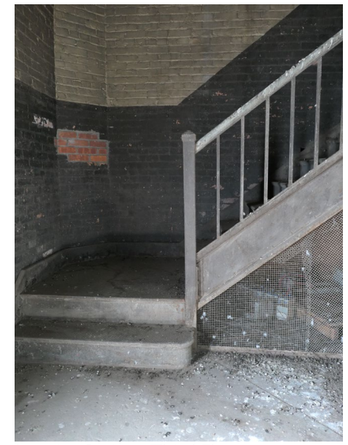
The original weight-driven clock movement for the tower clock is located on the Third Floor with the remnants of the original housing for the weights and pendulum extending down through the floor slab into the upper portion of the Second Floor and the drive shaft mechanism extends up the four clock faces just below the Fourth Floor.

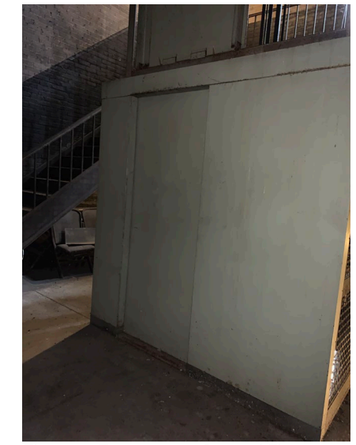
Floor: Exposed concrete slab.

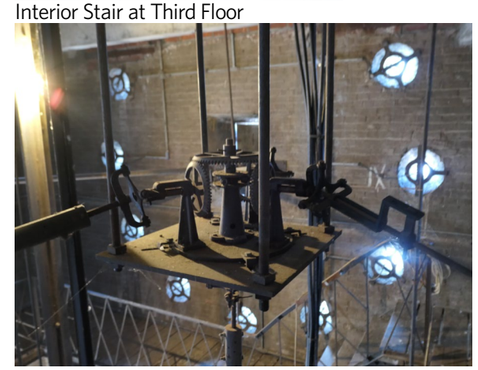
Walls: Painted brick with a dark colored lower portion (5'-0" +/-) in height following the slope of the run of the stairs and the remaining portion above to the next stair run/landing or floor above a light color. The brick interior face of the exterior walls is sound with very few areas of deteriorated mortar or efflorescence, but with a heavy surface layer of accumulated dust/dirt. The upper portion (approx. 5'-0" +/- above the slab) of the exterior walls of the Fourth Floor are unpainted brick as these are part of the 1966 reconstruction of the terra cotta-clad cupola and steel framing.

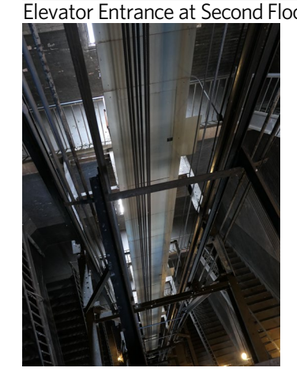
Ceilings: Exposed overhead concrete slab and steel construction.

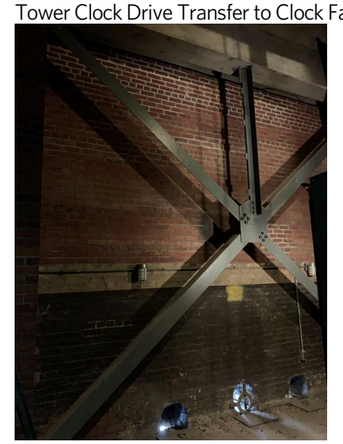
Lighting: These floors are currently only served by temporary construction-style string lighting. There is limited non-historic surface mounted lighting which is partially functioning.
Fittings: Existing cast iron steam radiators and long sections wall-mounted racked steam piping radiation remain intact and are still functioning.


Interior Stair at Third Floor


Elevator Entrance at Second Floor


Tower Clock Drive Transfer to Clock Faces


Open Elevator Hoistway at Third Floor


Transition from Original Construction to
1966 Reconstruction and Added Structure

Fifth Floor/Lower Observation Level

Description: This floor provides access to the lower observation deck with flush metal doors on the southeast and northwest facades and is the upper-most floor served by the elevator. Additionally, this floor level was part of the 1966 reconstruction.

Floor: Exposed concrete slab.

Walls: Unpainted exposed red brick in good condition with very little evidence of deterioration.

Ceilings: Exposed overhead concrete slab and concrete-encased steel construction.

Lighting: There is limited non-historic surface mounted lighting which is partially functioning and temporary construction-style string lighting.

Fittings: Existing floor-mounted cast iron steam radiators remains intact and still functioning.

Sixth Floor/Upper Observation Level

Description: This floor provides access to the upper observation deck with flush metal doors on the south and east facades of the octagonal portion of the cupola and ladder access to the roof hatch to the Lower Belfry Level above. This floor is accessed by the interior stair only and is not served by the elevator. Additionally, this floor level was part of the 1966 reconstruction. Electrical control equipment for the chimes is located on a small mezzanine above the interior stair enclosure.

Floor: Exposed concrete slab.

Walls: Unpainted exposed red brick in good condition with very little evidence of deterioration.

Ceilings: Exposed overhead concrete slab and concrete-encased steel construction.

Lighting: There is limited non-historic surface mounted lighting which is partially functioning and temporary construction-style string lighting.

Access to Lower Belfry from Sixth Floor

Chime Striker Housing in Lower Belfry

Interior Stair

Description: The original steel stringer and cast iron tread interior stair begins at the Ground Floor/Basement Level and continues to wind up to the Fourth Floor. There are numerous small landings within the stair runs which are made up of construction similar to the stair itself as well as larger partial floor slab landings made up of construction similar to a typical floor slab. At the open side of the stair runs and small landings, the painted steel picket railing is generally 32" above the stair tread nosing and the spacing of the pickets is greater than the 4". There is no guardrail at 42" above the stair nosing. Typical riser heights are approximately 7" - 7 1/2" and tread depths are approximately 10" plus a 1" nosing. There are no wall-mounted handrails on the wall side of the stairs.

At the large partial slab landings, the guardrail height is 42" above the landing level and the painted steel picket spacing greater than 4".

As part of the 1966 cupola reconstruction, the stairs from the Fourth Floor to the Upper Observation Level/Sixth Floor were replaced. Their construction is similar to the original remaining stair noted above and generally includes a wall-mounted handrail on the wall side of the stairs.

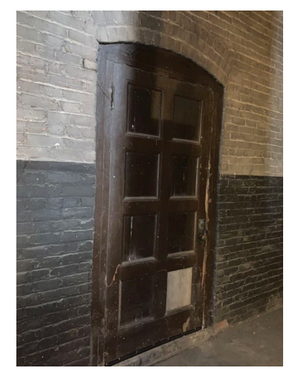
Windows

Description: The twelve (12) original single-glazed double-hung wood windows within the limestone portions of the facades are all intact but in poor condition and require replacement.

Exterior Doors

Ground Floor/Basement: The two (2) exterior entrance doors from the rear parking area appear to have been replaced and are fitted with exit devices and closers.

Second Floor: The original painted eight-panel stile and rail wood door and frame with hardware on the Court Street elevation balcony is intact and in poor to fair condition and not easily opened.


Second Floor Balcony Door

Fifth Floor/Lower Observation Level: The two (2) painted flush hollow metal doors and frames access the observation deck are intact and in fair condition and difficult to operate. The doors and frames are part of the 1966 cupola reconstruction.

Sixth Floor/Upper Observation Level: The two (2) painted flush hollow metal doors and frames access the observation deck are intact and in fair condition and difficult to operate. The doors and frames are part of the 1966 cupola reconstruction.

Conclusion

The conditions of the existing original architectural materials and finishes vary tremendously. Those that have been subject to long term exterior exposure such as the wood windows and doors have suffered the worst. Other finishes such as the Ground Floor/Basement Level plaster has been significantly affected by leaking from the failure of the plaza waterproofing above.

Generally, the more durable materials such as those in the Main Lobby show little sign of damage or wear, other than accumulated dirt and soiling which can easily be corrected. The upper portion of the Campanile, above the Main Lobby level, has survived extremely well primarily due to the simple and durable nature of the materials; painted steel, cast iron, painted brick and exposed concrete. With the level of deterioration and failures identified with the exterior limestone and terra cotta cladding, it is remarkable how little damage has occurred on the interior.

Targeted In-Situ Inspections

- **Limestone, Structural Steel Framing, and Waterproofing Probes**
  - Exterior Probe Specifications - February 24, 2019
  - Probe Location Drawings - November 16, 2019

- Exterior Probe Inspection Results included as a part of respective Existing Conditons Report by Silman and Simpson Gumpertz & Heger, Inc., included earlier in this report.

Date: August 31, 1910 *Photo: City of Springfield*

Silman

February 24, 2019

EXTERIOR PROBE SPECIFICATION: PROBE NOTES
Springfield Campanile, Springfield, MA

Structural Engineers

111 Devonshire Street
Boston, MA 02109
617 695 6700
silman.com

I. DESCRIPTION OF PROJECT

The Springfield Campanile is a 300-foot tower originally opened constructed between 1909-1931, with a major renovation to the top third of the tower in the mid- to late-1960s. The structure is steel-framed with cross-bracing on all four sides for lateral stability, supporting brick masonry walls and exterior limestone cladding for the lower two-thirds of the tower. The exact support conditions and anchorage of the limestone is unknown.

II. GENERAL CONDITIONS

A. Scope of Work and General Notes

1. Under these notes, the Contractor shall furnish all labor, materials, equipment and other facilities as necessary to complete the probes at the locations called for on the attached Probe Location Plan. The work shall proceed in such a manner that the condition and characteristics of the various materials, in their natural state, can be accurately ascertained.

2. The Engineer may order additional probes or increase the extent of any probe, or the elimination or reduction in extent of any probe and the Contractor shall make such adjustments in the required probes at the unit prices fixed in the proposal.

3. The Contractor shall provide temporary alternate means of egress around these probes as directed by the Architect. Temporary repairs as directed by the Architect shall be completed before the probe phase of work can be considered complete.

4. The Contractor shall cart away all debris, tools, etc. and safely and properly dispose of all waste materials.

5. The Contractor shall allow for the Engineer and Architect to observe areas of probes during and after the making of probes.

6. All removals of limestone, wall material, brick masonry, etc. must be done with care to allow for future re-installation.

7. Provide temporary covers for all exterior probes to protect interior of wall structure from weather.

8. The Contractor shall provide lights to allow for examination of all probes.

9. The Contractor shall provide the necessary temporary shoring and bracing as required to safely complete the work described herein, including shoring the cladding remaining in place and shoring the plaza and base structures on which scaffolding or lifts bear.

B. Examination of Site

1. Each bidder shall visit the site of the proposed probes and fully familiarize himself with conditions, as they exist, including a thorough examination of existing utilities, if necessary.

2. The Probe Location Plan should be used as a schematic drawing only. The Contractor shall confirm all dimensions, conditions, etc in field prior to commencement of exploratory work. Notify Engineer if any conflicts or questions arise.

3. Contractor shall coordinate any special needs regarding storage space, utilities, scheduling, and/ or protection of work in progress with client.

C. Probes

1. The Contractor shall provide temporary shoring and bracing and protect all areas affected by probing.

2. The probes shall be executed as noted and located on the Probe Location Plan and as described in this set of notes.

3. After the probes have been surveyed by the Architect and the Engineer, the Contractor is to protect the probe locations from further exposure to damage until the Engineer or Architect specifies permanent repairs and executed. All required shoring and bracing shall be kept in place while temporary repairs are in place (unless the Contractor's engineer certifies in writing that said shoring is not required to remain in place). The work described in each of the individual probe descriptions shall be considered part of the base bid/ unit price for that probe.

D. Additional Notes

1. The Contractor shall provide separate price for each one of the probes below. Contractor shall note that each of these prices may be used as an add-alternate or as a deduct-alternate price

III. EXECUTION OF PROBES

The following text describes the scope of work for each probe.

Note: For plaza waterproofing probes, see "Proposed Exploratory Openings in Plaza Waterproofing" plan by SGH.

Probe #	Probe Description
Probe P1	Northwest side: Remove stone at interior bay. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure. Purpose of probe is to observe lintel or other structural support condition at spandrel.
Probe P2	Northwest side: Remove stone at interior bay. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure. Purpose of probe is to observe lintel or other structural support condition at spandrel at mid-height between landings.
Probe P3	Northeast side: Remove stone at corner column with existing spall. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure.
Probe P4	Northwest side: Remove stone at interior bay that is horizontally displaced. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure. Purpose of probe is to observe lintel or other structural support condition at spandrel at mid-height between landings.
Probe P5	Northeast side: Remove stone at interior bay. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow

for observation and measurement of exposed structure. Purpose of probe is to observe lintel or other structural support condition at spandrel.

Probe P6 — Southwest side: Remove stone at interior bay. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure.

Probe P7 — Northwest/Northeast side: Remove cracked corner stone at existing vertical crack. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure.

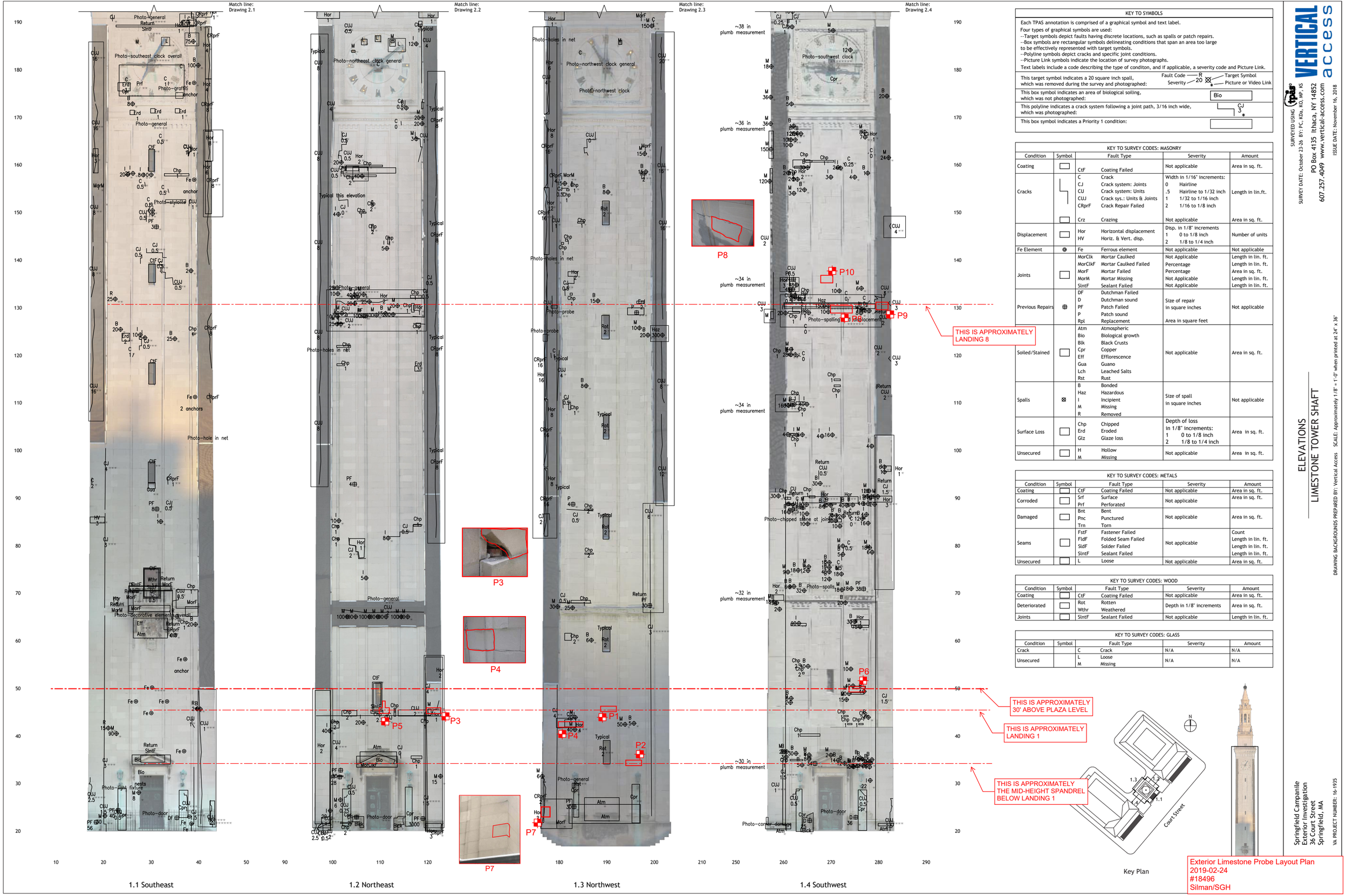
Add-Alternate: Probes P8-P10 are to be priced separately, as access requirements are different for probes at this height than for probes within 30 feet of base of tower

Probe P8 — Southwest side: Remove stone at interior bay. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure.

Probe P9 — Southwest side: Remove corner stone. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure.

Probe P10 — Southwest side: Remove interior stone. Cut only mortar joints (do not cut stone). Maintain all existing anchors, structural steel support, backup masonry, and other found materials in place. Allow for observation and measurement of exposed structure.

4



KEY TO SYMBOLS

Each TPAS annotation is comprised of a graphical symbol and text label.
Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.
Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed:	Fault Code — R; Severity — 20; Target Symbol; Picture or Video Link
This box symbol indicates an area of biological soiling, which was not photographed:	Bio
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed:	CJ
This box symbol indicates a Priority 1 condition:	

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C CJ CU CUJ CRprF	Crack Crack system: Joints Crack system: Units Crack sys.: Units & Joints Crack Repair Failed	Width in 1/16" increments: 0 Hairline .5 Hairline to 1/32 inch 1 1/32 to 1/16 inch 2 1/16 to 1/8 inch	Length in lin.ft.
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor HV	Horizontal displacement Horiz. & Vert. disp.	Disp. in 1/8" increments 1 0 to 1/8 inch 2 1/8 to 1/4 inch	Number of units
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk MorClkF MorF MorM SlntF	Mortar Caulked Mortar Caulked Failed Mortar Failed Mortar Missing Sealant Failed	Not Applicable Percentage Percentage Not Applicable Not Applicable	Length in lin. ft. Length in lin. ft. Area in sq. ft. Length in lin. ft. Length in lin. ft.
Previous Repairs		DF D PF P Rpl	Dutchman Failed Dutchman sound Patch Failed Patch sound Replacement	Size of repair in square inches Area in square feet	Not applicable
Soiled/Stained		Atm Bio Blk Cpr Eff Gua Lch Rst	Atmospheric Biological growth Black Crusts Copper Efflorescence Guano Leached Salts Rust	Not applicable	Area in sq. ft.
Spalls		B Haz I M R	Bonded Hazardous Incipient Missing Removed	Size of spall in square inches	Not applicable
Surface Loss		Chp Erd Glz	Chipped Eroded Glaze loss	Depth of loss in 1/8" increments: 1 0 to 1/8 inch 2 1/8 to 1/4 inch	Area in sq. ft.
Unsecured		H M	Hollow Missing	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: METALS

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf Prf	Surface Perforated	Not applicable	Area in sq. ft.
Damaged		Bnt Pnc Trn	Bent Punctured Torn	Not applicable	Area in sq. ft.
Seams		FstF FldF SldF SlntF	Fastener Failed Folded Seam Failed Solder Failed Sealant Failed	Not applicable	Count Length in lin. ft. Length in lin. ft. Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot Wthr	Rotten Weathered	Depth in 1/8" increments	Area in sq. ft.
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L M	Loose Missing	N/A	N/A

Key Plan

VERTICAL access
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com

SURVEYED USING tpas

SURVEY DATE: October 23-26 BY: PC, KDs, KO, MP, KS

ISSUE DATE: November 16, 2018

ELEVATIONS
LIMESTONE TOWER SHAFT

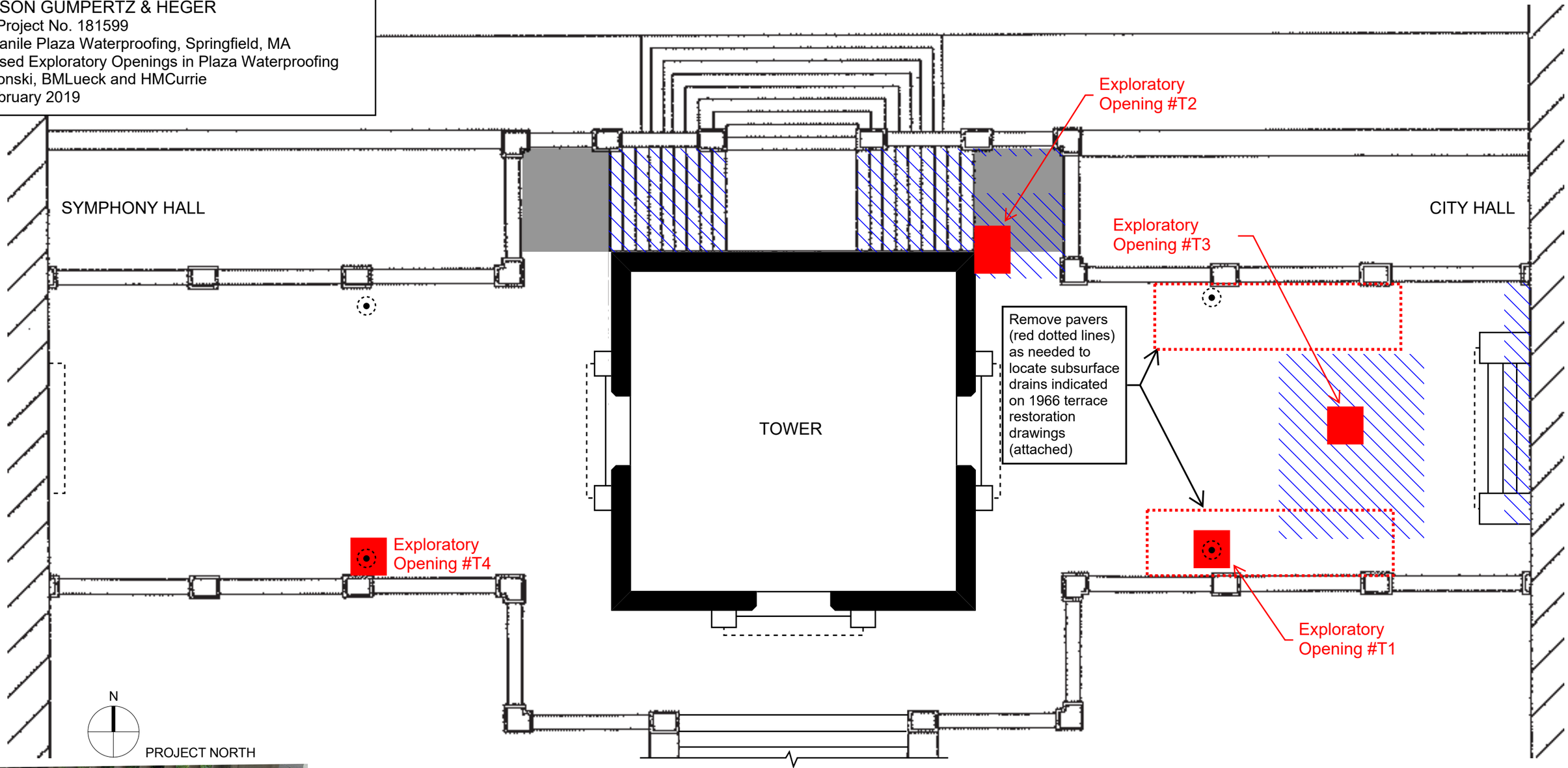
DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

Exterior Limestone Probe Layout Plan
2019-02-24
#18496
Silman/SGH

SIMPSON GUMPERTZ & HEGER
SGH Project No. 181599
Campanile Plaza Waterproofing, Springfield, MA
Proposed Exploratory Openings in Plaza Waterproofing
MBBronski, BMLueck and HMCurrie
22 February 2019



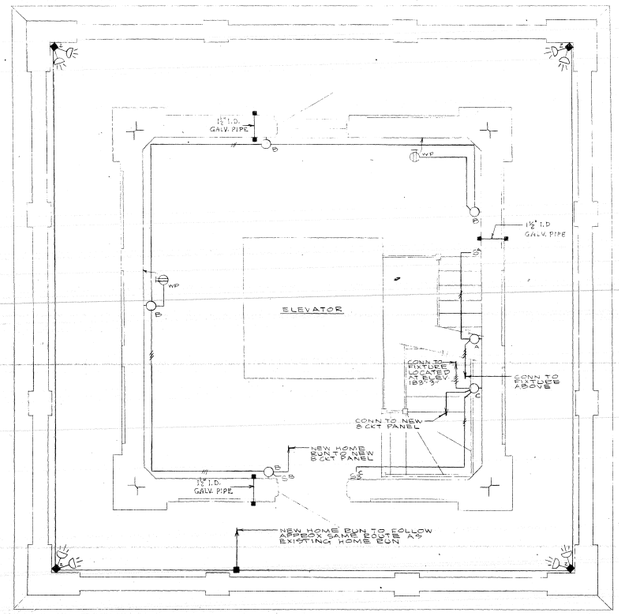
PLAZA LEVEL PLAN
N.T.S.

Photo 1

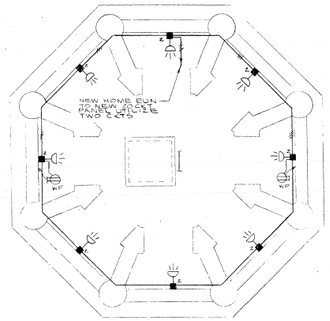
General Notes:
1. The plaza waterproofing assembly consists of loose-laid pavers on pedestals (i.e. not interlocking, mechanically fastend, grouted, etc.) that are installed atop a waterproof or water-resistant material (see Photo 1 at left). Based on the "Reconstruction of the Municipal Tower" drawings dated 15 February 1966, (attached) the waterproof or water resistant material consists of "new fill and composite floor and base", the exact material and composition of which is unknown. It is not indicated in the 1966 drawings whether any of the original terrace waterproofing materials exist beneath this "composite floor and base". Thus, the contract needs to be prepared to open and repair a variety of roofing/waterproofing materials in the field.
2. At the perimeter counterflashing, a reglet is cut into the stone at the base of the buildings and balustrade. We may wish to bend or remove a portion of the metal flashing or reglet to document the existing detailing at rising wall terminations. Thus, the contractor needs to be prepared to open and repair sheet metal flashing and reglets.
3. Assume each exploratory opening is about 2 ft. x 2 ft. in size at the topmost surface and may taper or "step" down to the topside of the structural concrete deck (minimum 8 in. x 8 in. exposure of the structure deck).

LEGEND:

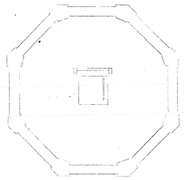
- Proposed investigation opening: removal of all materials to top surface of original structural slab
- Presumed location of drain based on 1966 Drawings (attached)
- Approximate area of water damage at interior ceiling and walls below plaza



PLAN AT ELEV. 200'-3½"



PLAN AT ELEV. 258'-3"

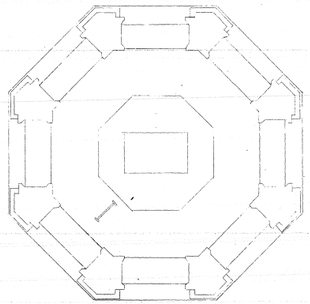


PLAN AT ELEV. 268'-0"

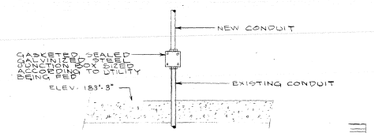
SYMBOL LIST

- WALL BRACKET FIXTURE W/OUTLET MCPHILBEN CAT # 33 44 WITH 100 W I.E. LAMP OR APPROVED EQUAL MTD 6'-0" ABOVE FINISHED FLOOR
- FLOOD LIGHT STONCO CAT # 190 L W/ 150 W PAR 38 FLOOD LAMP OR APPROVED EQUAL
- JUNCTION BOX STONCO CAT # 7-C OR APPROVED EQUAL
- SINGLE POLE SW. UPPER LETTER INDICATES SWITCH CONTROL
- CONDUIT RUN EXPOSED
- DUPLEX RECEPTACLE W.P. INDICATES WEATHERPROOF
- CONDUIT RISER
- TV JUNCTION BOX SIZE IN ACCORDANCE W/ ANTENNA REQUIREMENTS
- THREE WAY SWITCH

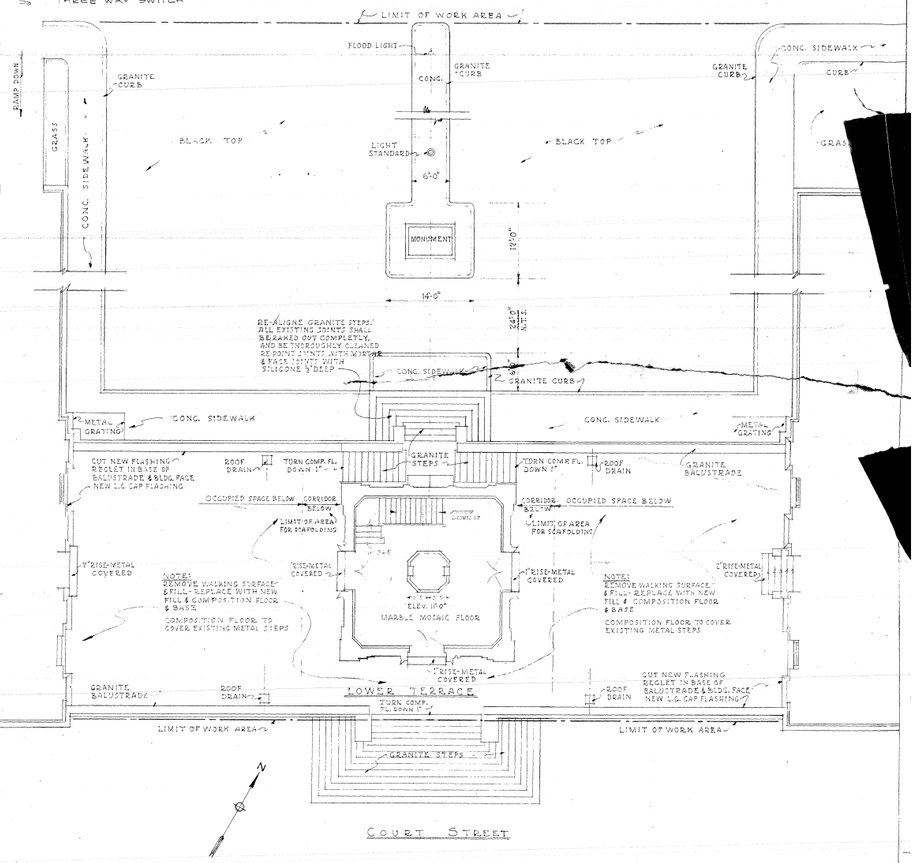
PLAN AT ELEV. 283'-8"



PLAN AT ELEV. 225'-2⅝"



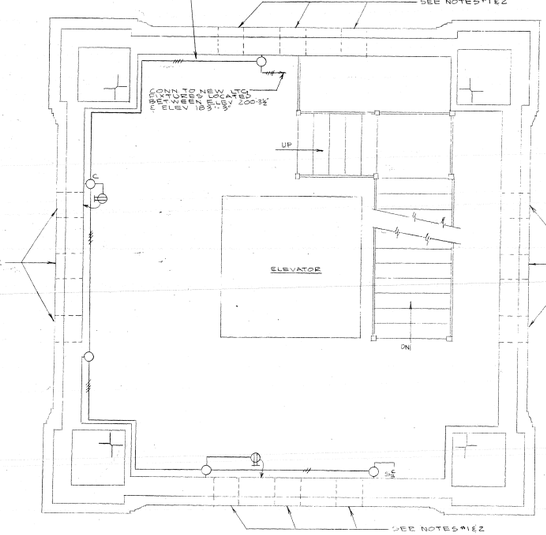
DETAIL SHOWING METHOD OF CUTTING BACK EXISTING CONDUITS
-NTS-



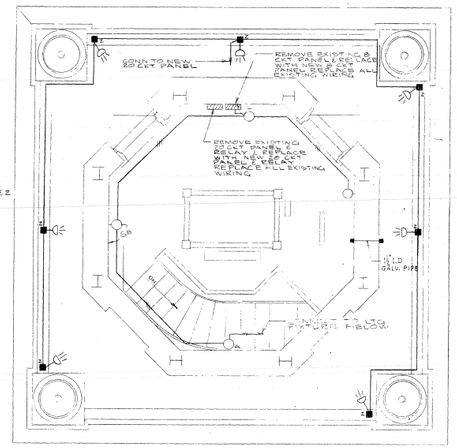
SITE PLAN OF TOWER

SCALE 1/8" = 1'-0"

ALL ELEC. CONDUITS, FEEDER AND/OR CONTROL WIRING SHALL BE CUT BACK TO THIS LEVEL PRIOR TO DEMOLITION OF UPPER TOWER & EXTENDED AS REQUIRED FOR SERVICING TO ELEC. EQUIPMENT AS INDICATED ON THIS PLAN OR WHICH EXISTS PRIOR TO DEMOLITION SEE DETAIL THIS DWG



PLAN AT ELEV. 200'-3½"



PLAN AT ELEV. 225'-2⅝"

NOTE
ALL PLANS AT SCALE 1/8" = 1'-0"

PLAN AT ELEV. 183'-3"

NOTES

1. DISCONNECT & REMOVE THESE ILLUMINATED CLOCK NUMERALS PRIOR TO DEMOLITION AND REPLACE & RECONNECT SAME UPON COMPLETION OF CONSTRUCTION
2. DISCONNECT ALL ELECTRICAL ENERGY TO THE CLOCK TO PREVENT POSSIBLE INJURY DURING CONSTRUCTION

PLAN AT ELEV. 220'-6⅛"

Springfield Municipal Tower
Construction of the
Clock Shop Project
Microfilm Date: 2/10/1986

REGISTERED ARCHITECT No. 675 NO. BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS

SITE PLAN & ELECTIC PLANS

RECONSTRUCTION OF THE MUNICIPAL TOWER

SPRINGFIELD, MASS.

DRAWN BY	CHECKED BY	APPROVED BY	COMM. NO.	DWG. NO.
SCALE AS NOTED	DATE FEB. 15, 1966		1248	A-1

HOYLE, DORAN AND BERRY, ARCHITECTS
LEXINGTON STREET, NEWTON, MASS.

Drawings

- **Architectural Plans, Elevations and Sections** *(Bruner/Cott Architects)*
  - Drawing E-000 - Cover
  - Drawing A-101E - Existing First Floor/Plaza Level Plan
  - Drawing A-102E - Existing Ground Floor Plan
  - Drawing A-103E - Existing Sub-Basement Plan
  - Drawing A-104E - Existing Tower Floor Plans
  - Drawing A-105E - Existing Tower Floor Plans
  - Drawing A-106E - Existing Tower Floor Plans
  - Drawing A-107E - Project 3D Axon/Perspective View
  - Drawing A-301E - Construction and Renovation Timeline
  - Drawing A-302E - Exterior Elevations
  - Drawing A-303E - Section
  - Drawing A-605E - Structural and Facade - Analysis

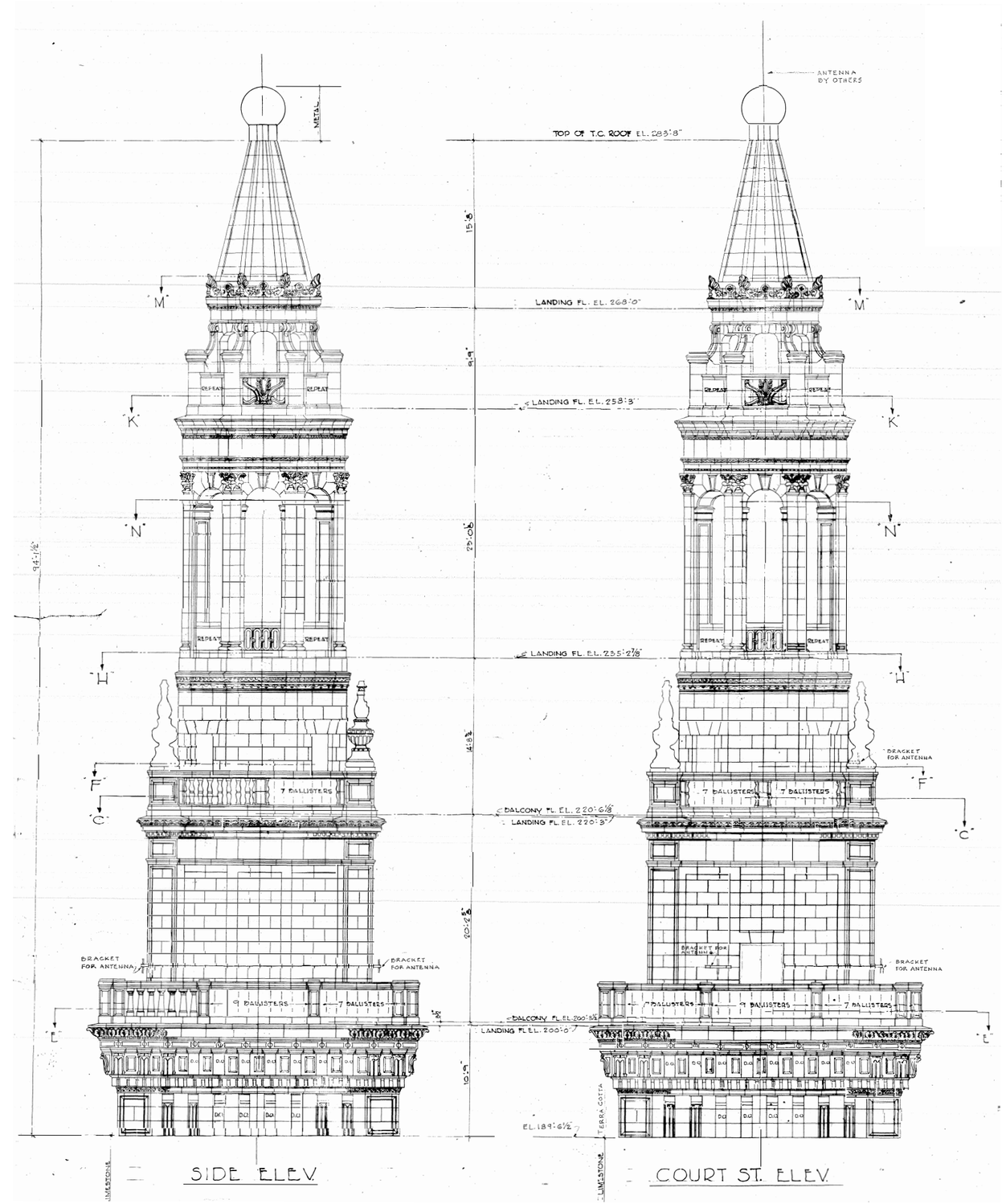


Image: Excerpt from Dwg. A-3 by Hoyle, Doran and Berry , Architects, February 15, 1966

Bruner/Cott
ARCHITECTS
225 Friend St., Suite 701
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Springfield Campanile Investigations & Discovery Phase

34-36 Court Street, Springfield, MA 01103

Investigations & Discovery Drawings

SCALE: 1" = 75'-0"

SHEET LIST - INVESTIGATIONS & DISCOVERY PHASE

SHEET NUMBER	SHEET NAME
EXISTING	
A-101E	EXISTING FIRST FLOOR / PLAZA LEVEL PLAN
A-102E	EXISTING TOWER GROUND FLOOR PLAN
A-103E	EXISTING TOWER SUB-BASEMENT PLAN
A-104E	EXISTING TOWER FLOOR PLANS
A-105E	EXISTING TOWER FLOOR PLANS
A-106E	EXISTING TOWER FLOOR PLANS
A-107E	PROJECT 3D AXON / PERSPECTIVE VIEW
A-301E	CONSTRUCTION AND RENOVATION TIMELINE
A-302E	EXTERIOR ELEVATIONS
A-303E	SECTIONS
A-605E	STRUCTURAL AND FACADE - ANALYSIS

Rev	Date	Remarks

Date	8 NOV 2019
Scale	
Project Number	18.016
Drawn By	MS

N

COVER

E-000

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

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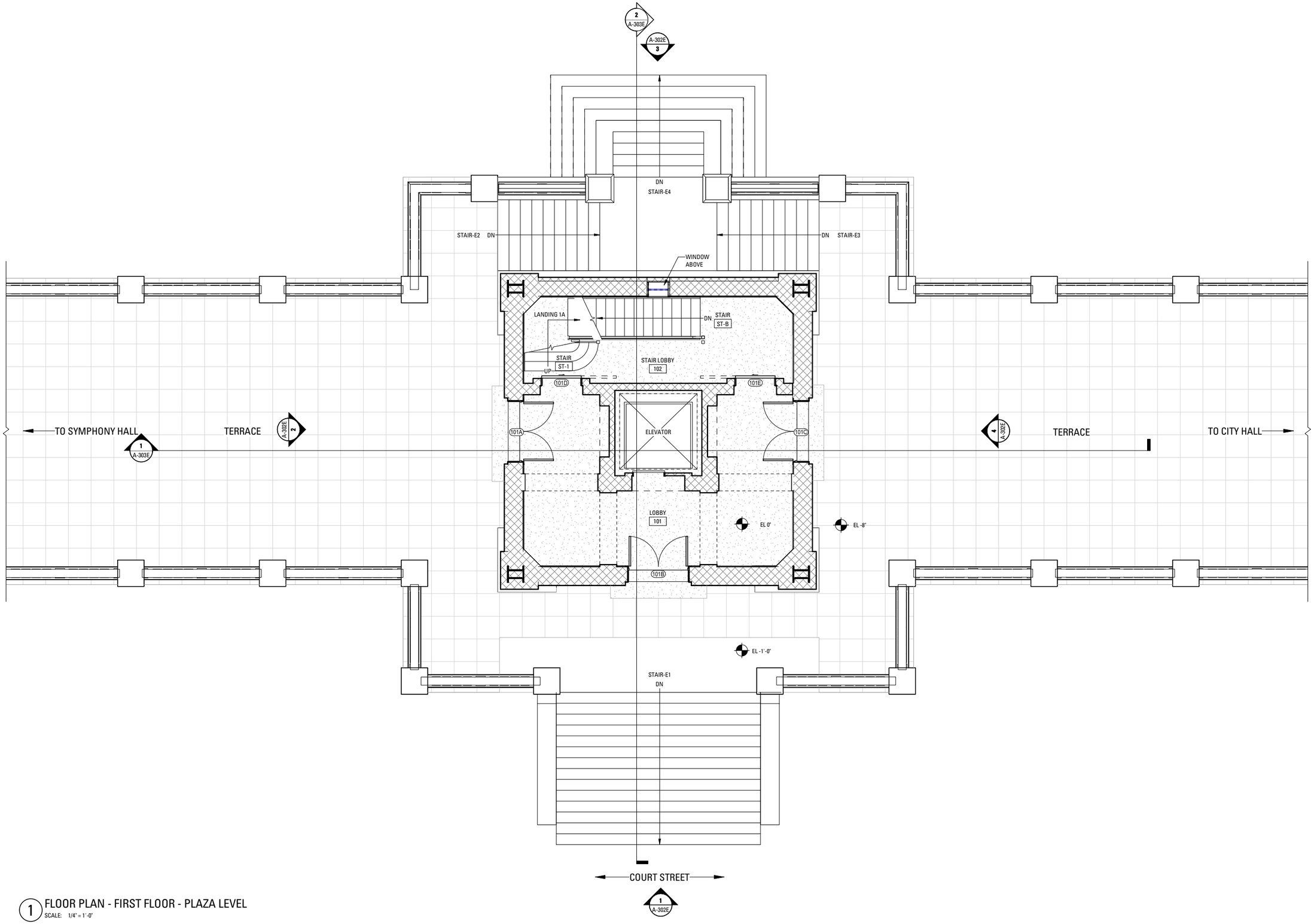

1 FLOOR PLAN - FIRST FLOOR - PLAZA LEVEL
SCALE: 1/4" = 1'-0"

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Date	8 NOV 2019
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Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

EXISTING FIRST FLOOR / PLAZA LEVEL PLAN

A-101E

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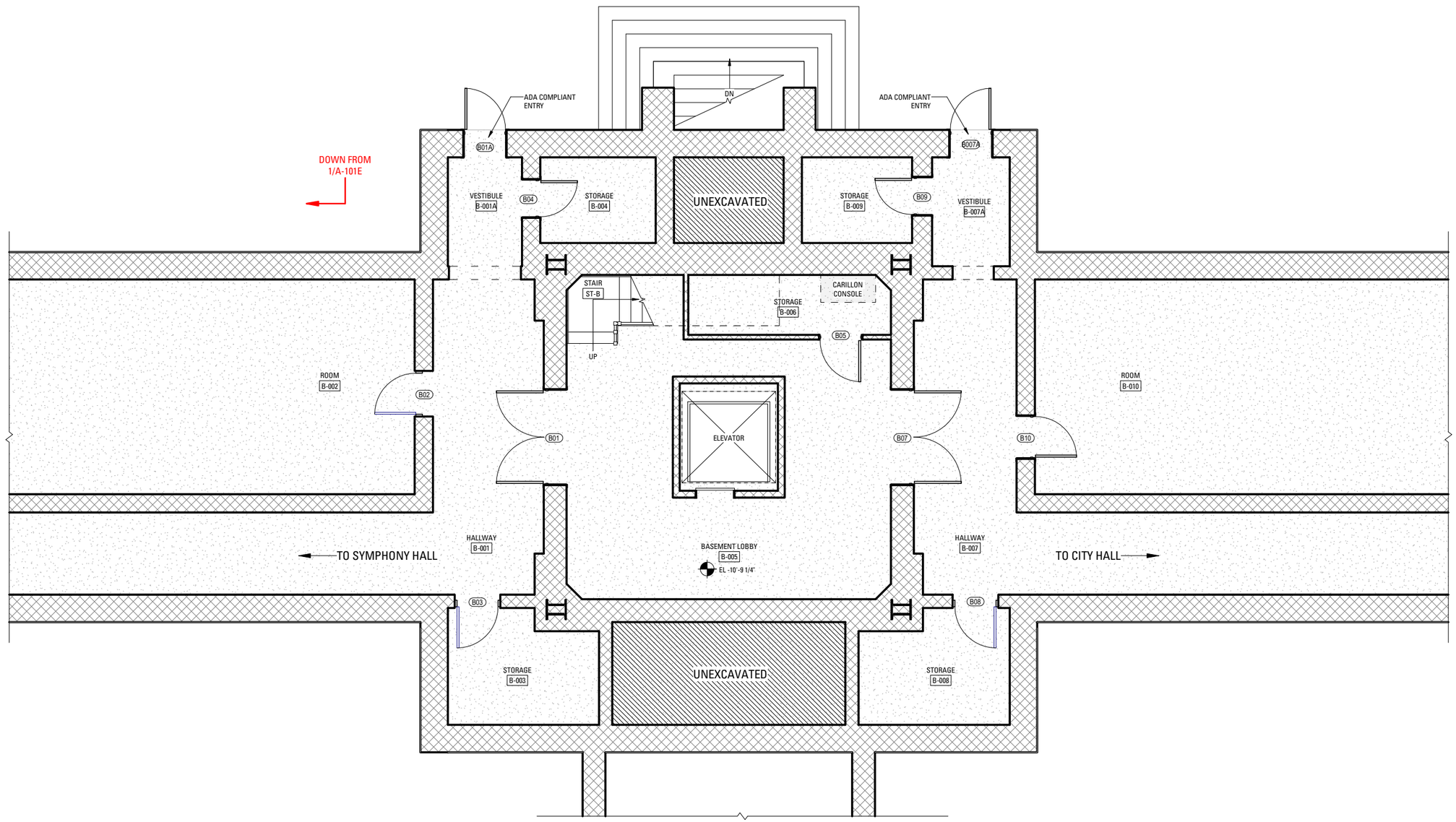

1 FLOOR PLAN - GROUND FLOOR
SCALE: 1/4" = 1'-0"

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Date	8 NOV 2019
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Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

EXISTING TOWER GROUND FLOOR PLAN

A-102E

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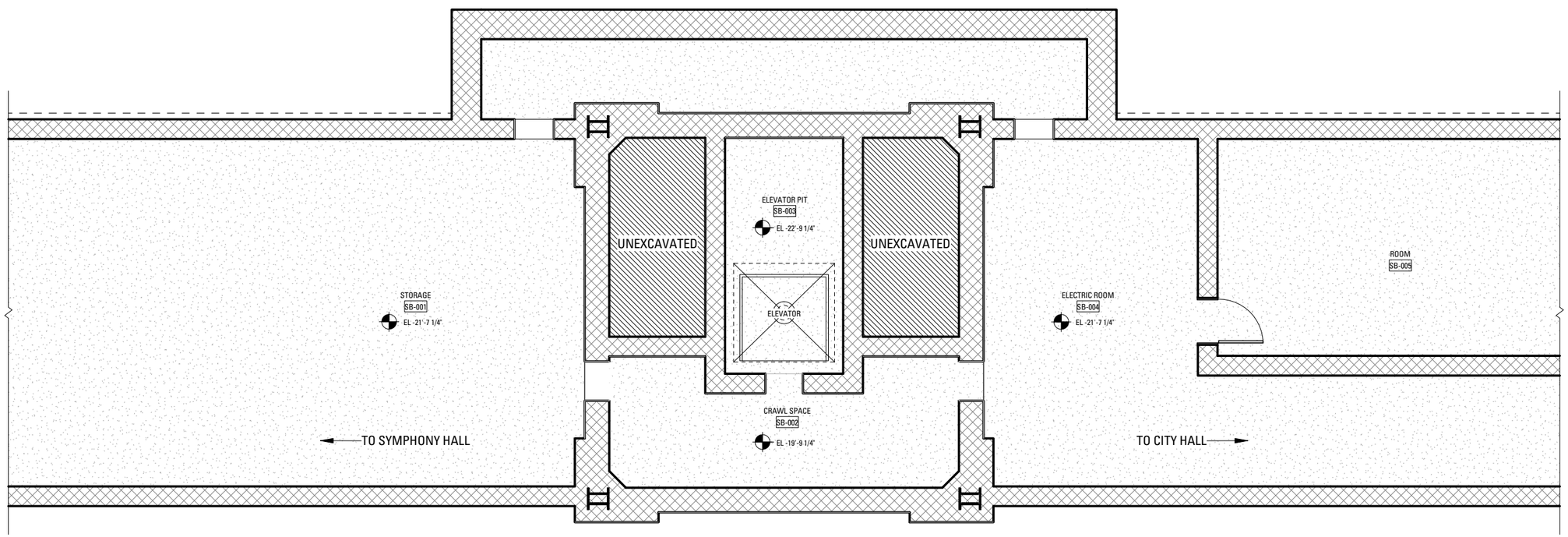
Date	8 NOV 2019
Scale	1/4" = 1'-0"
Project Number	18.016
Drawn By	MS



1 FLOOR PLAN - SUB BASEMENT FLOOR
SCALE: 1/4" = 1'-0"

EXISTING TOWER
SUB-BASEMENT PLAN

A-103E

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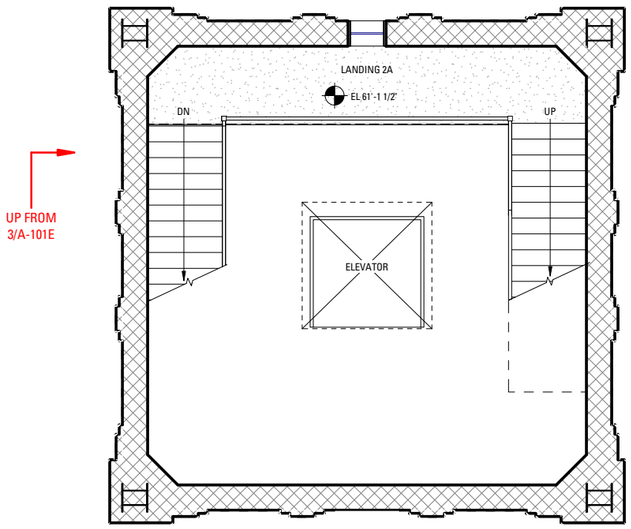
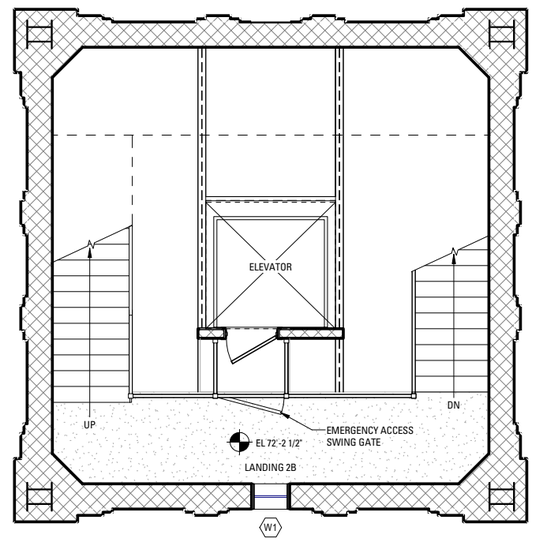
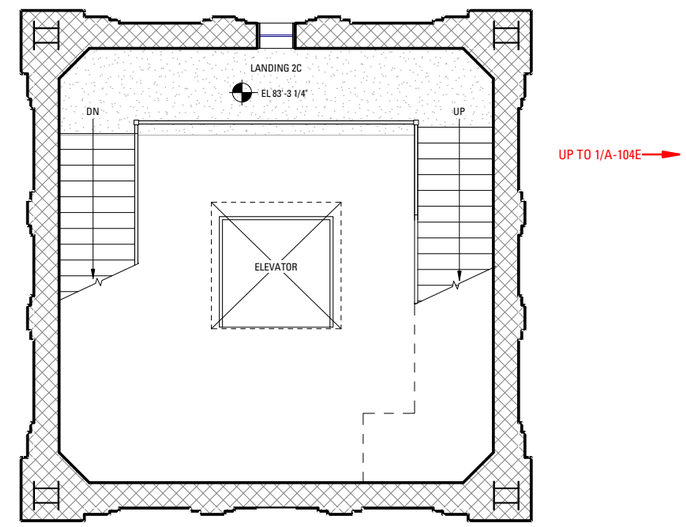


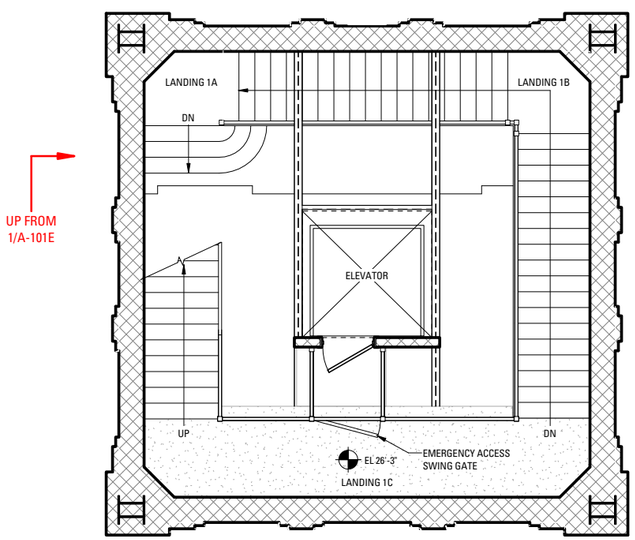
4 FLOOR PLAN - STAIR LANDING 2A
SCALE: 1/4" = 1'-0"



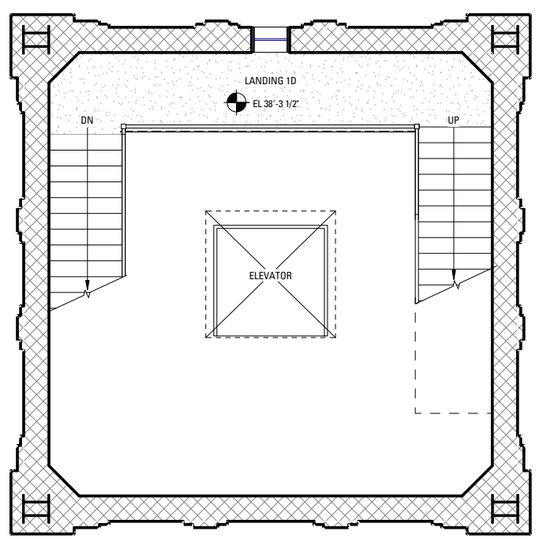
5 FLOOR PLAN - STAIR LANDING 2B
SCALE: 1/4" = 1'-0"



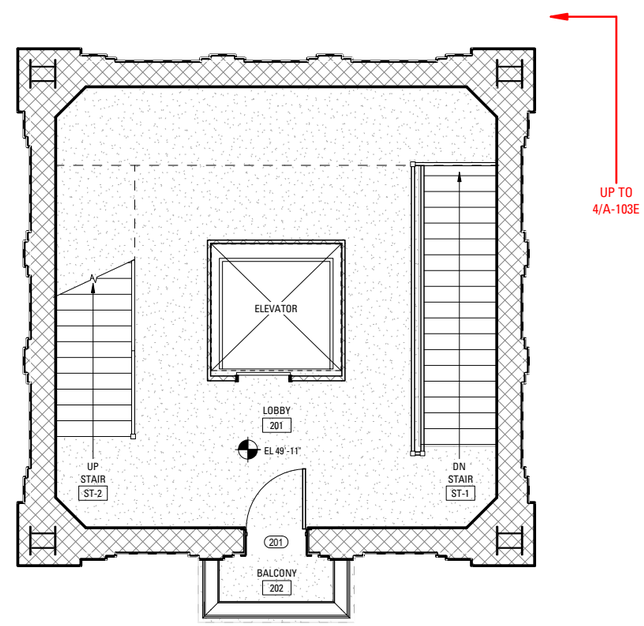
6 FLOOR PLAN - STAIR LANDING 2C
SCALE: 1/4" = 1'-0"



1 FLOOR PLAN - STAIR LANDING 1C
SCALE: 1/4" = 1'-0"



2 FLOOR PLAN - STAIR LANDING 1D
SCALE: 1/4" = 1'-0"



3 FLOOR PLAN - SECOND FLOOR
SCALE: 1/4" = 1'-0"

Rev	Date	Remarks

Date	8 NOV 2019
Scale	1/4" = 1'-0"
Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

N

EXISTING TOWER FLOOR PLANS

A-104E

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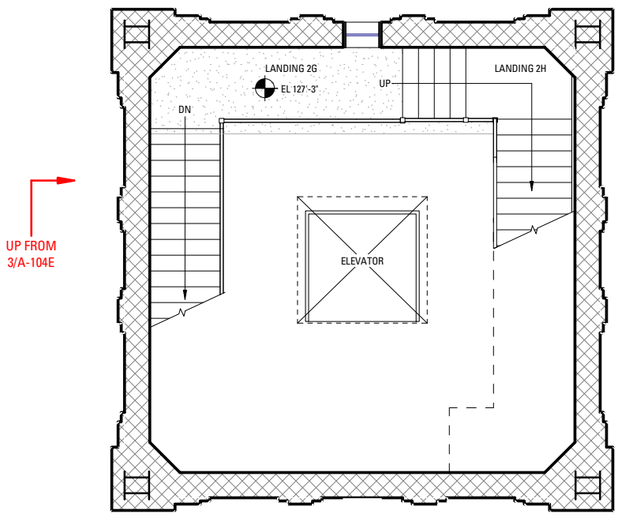

4 FLOOR PLAN - STAIR LANDING 2G & 2H
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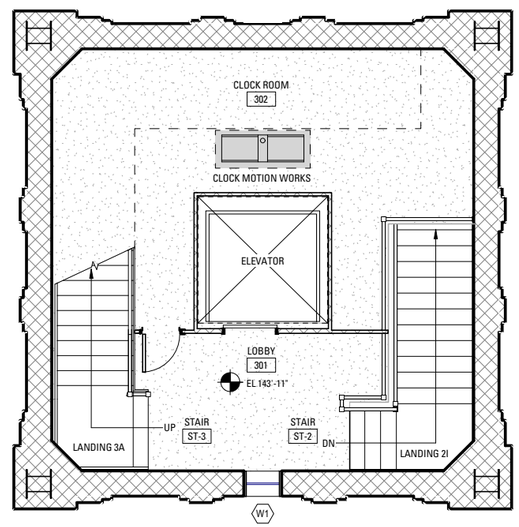

5 FLOOR PLAN - THIRD FLOOR
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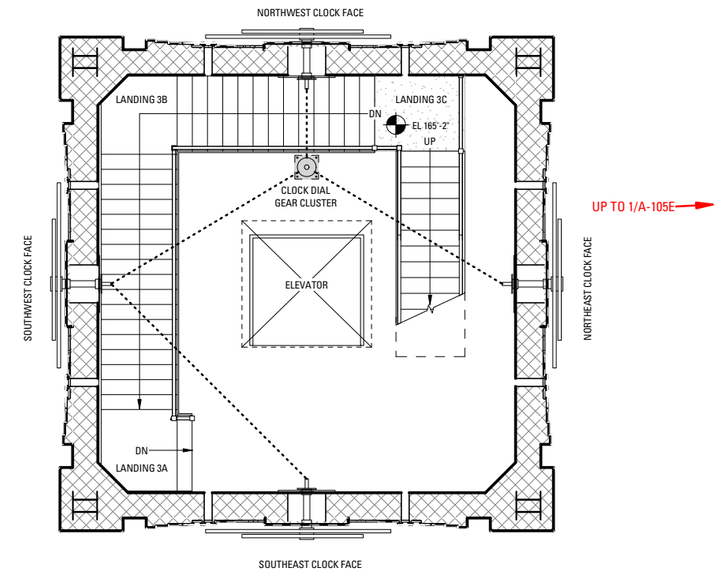
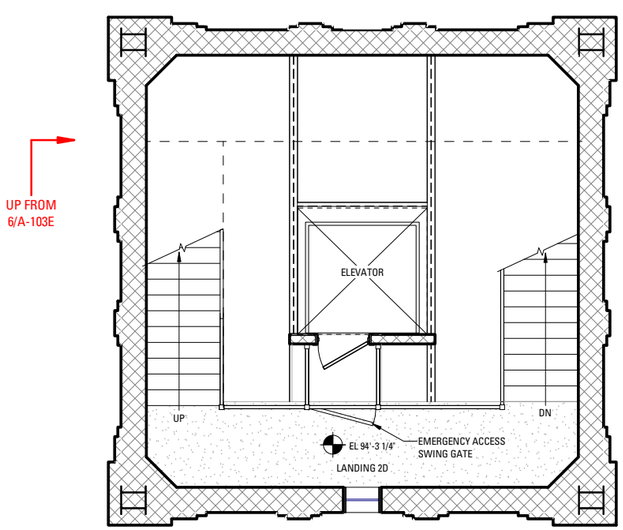
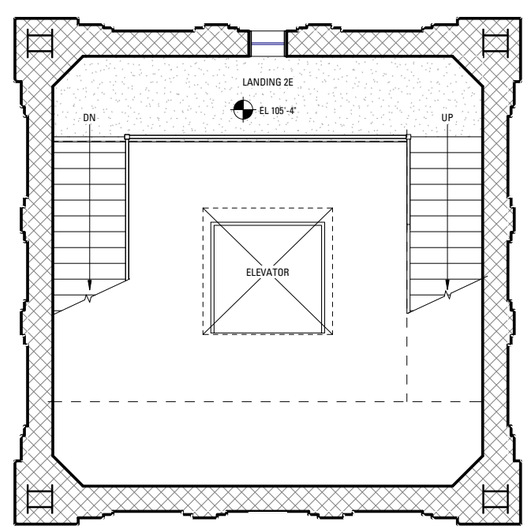


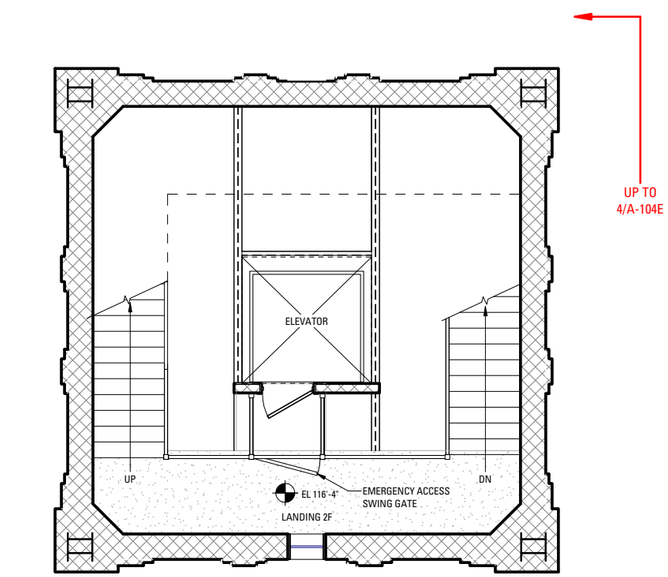
6 FLOOR PLAN - STAIR LANDING 3A, 3B, & 3C
SCALE: 1/4" = 1'-0"



1 FLOOR PLAN - STAIR LANDING 2D
SCALE: 1/4" = 1'-0"



2 FLOOR PLAN - STAIR LANDING 2E
SCALE: 1/4" = 1'-0"



3 FLOOR PLAN - STAIR LANDING 2F
SCALE: 1/4" = 1'-0"

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INVESTIGATIONS &
DISCOVERY

EXISTING TOWER FLOOR
PLANS

A-105E

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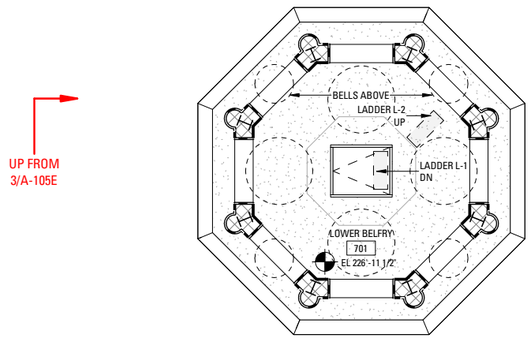
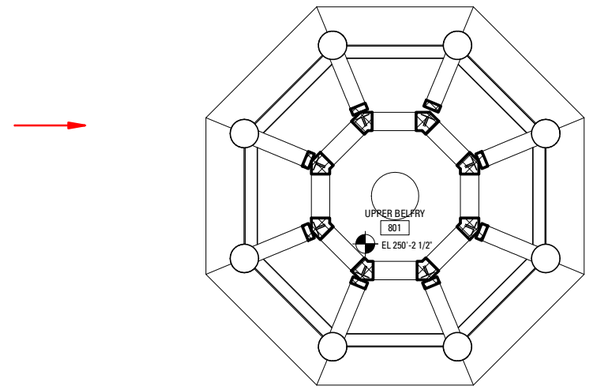
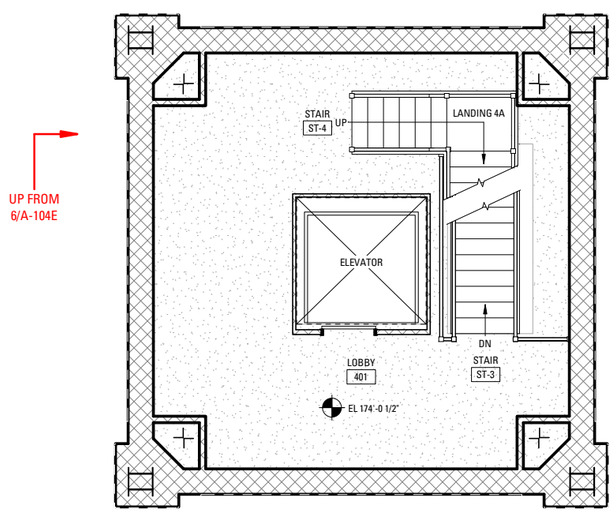


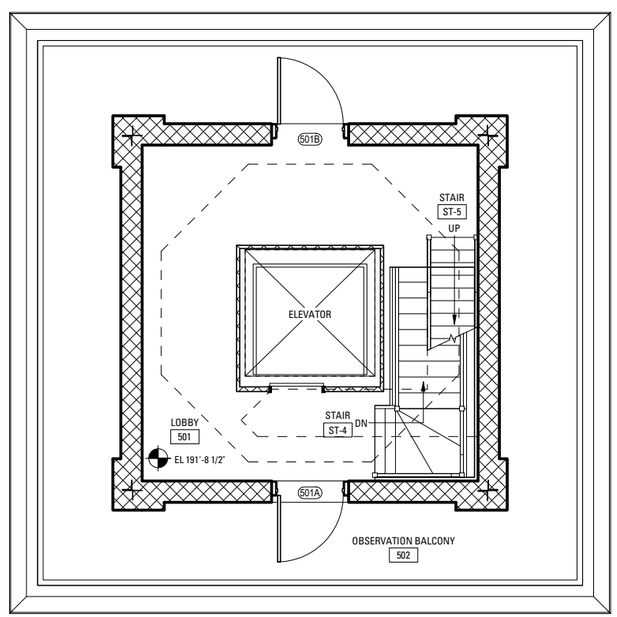
4 FLOOR PLAN - LOWER BELFRY FLOOR
SCALE: 1/4" = 1'-0"



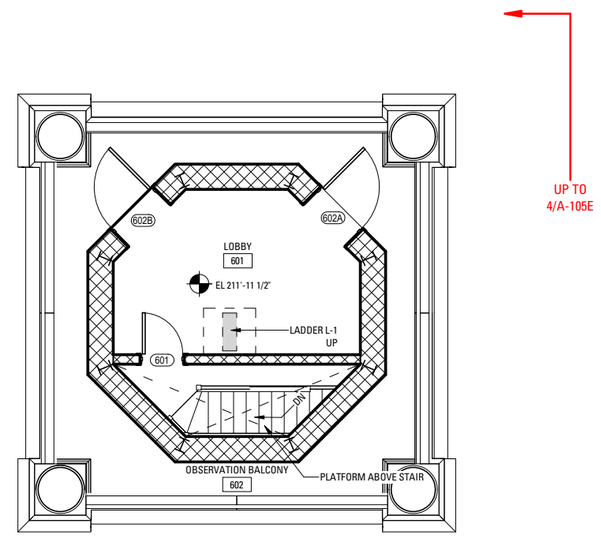
5 FLOOR PLAN - UPPER BELFRY
SCALE: 1/4" = 1'-0"



1 FLOOR PLAN - FOURTH FLOOR
SCALE: 1/4" = 1'-0"



2 FLOOR PLAN - FIFTH FLOOR - LOWER OBSERVATION LEVEL
SCALE: 1/4" = 1'-0"



3 FLOOR PLAN - SIXTH FLOOR - UPPER OBSERVATION LEVEL
SCALE: 1/4" = 1'-0"

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Date	8 NOV 2019
Scale	1/4" = 1'-0"
Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

EXISTING TOWER FLOOR PLANS

A-106E

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

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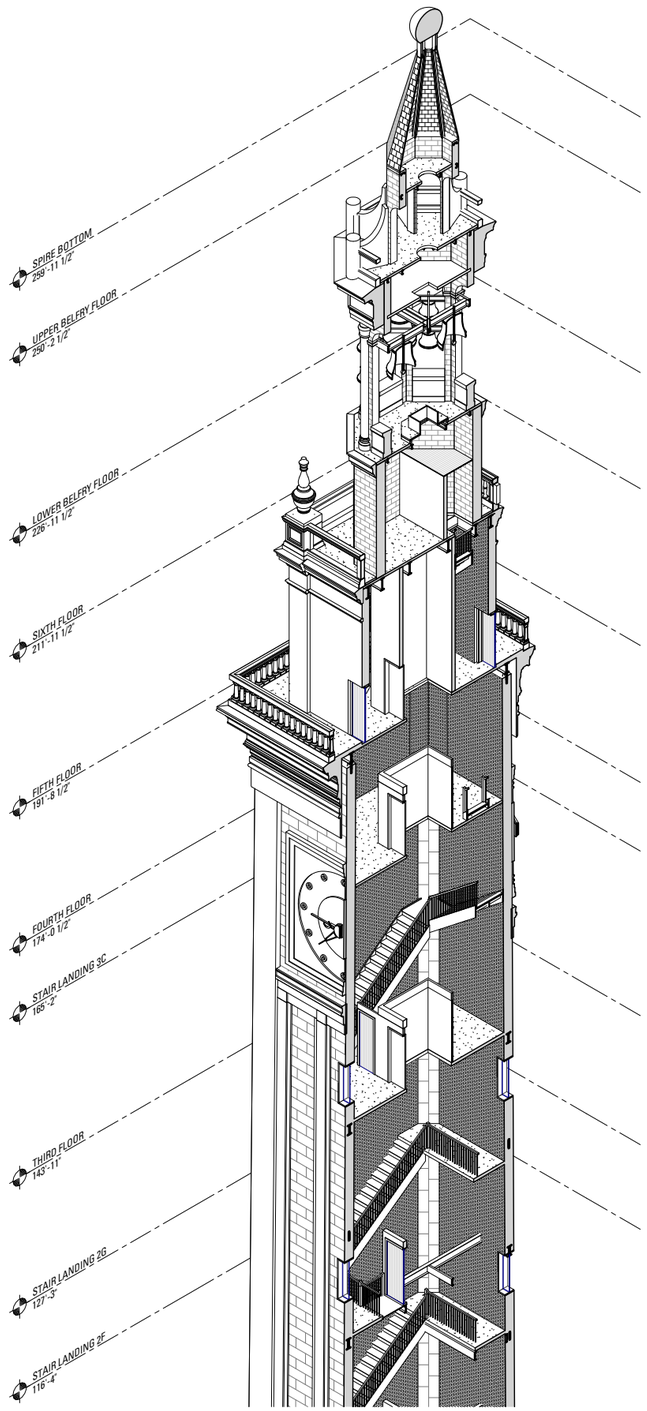
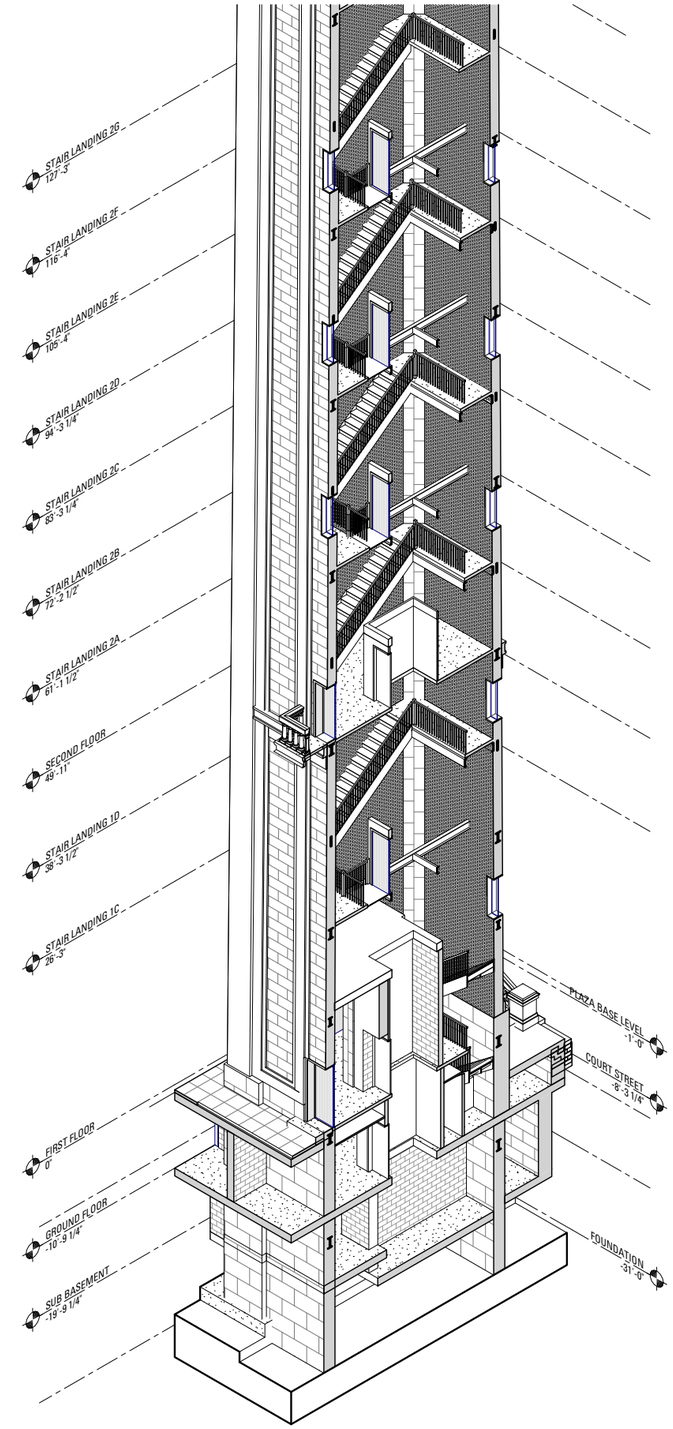


1 3D AXON - TOWER SPIRE
SCALE:



2 3D AXON - TOWER SHAFT
SCALE:

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Scale	
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Drawn By	MS

INVESTIGATIONS & DISCOVERY

PROJECT 3D AXON / PERSPECTIVE VIEW

A-107E

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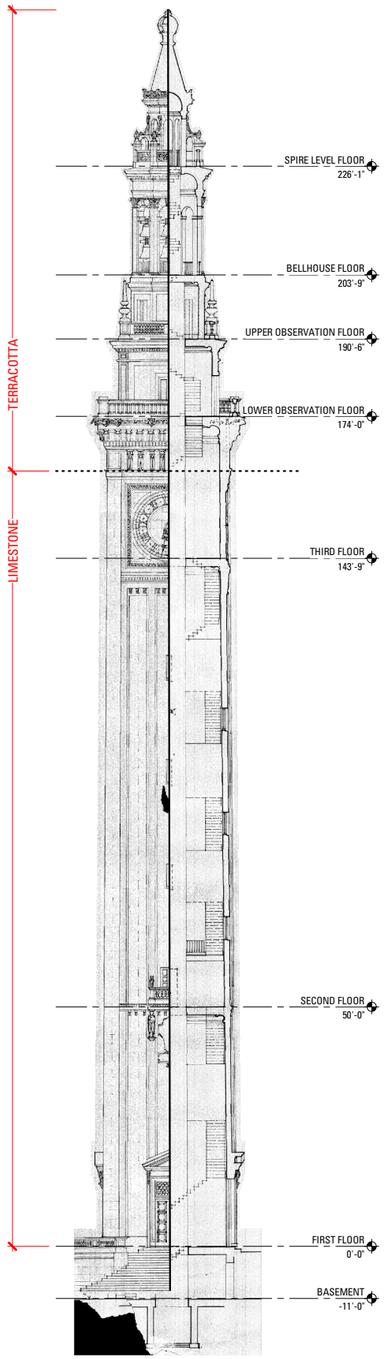
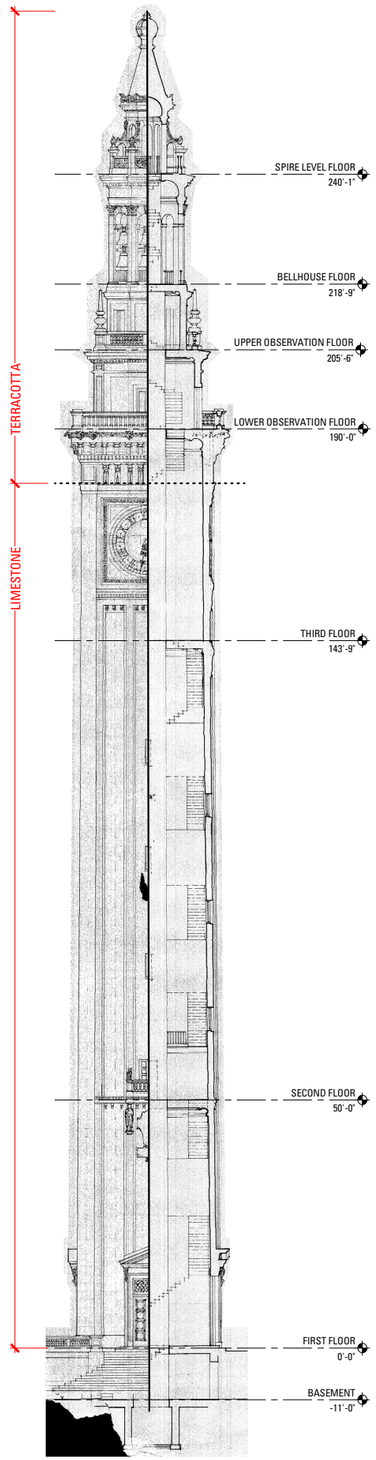


1 Elevation Section - 1909 As Drawn
SCALE: 1/16" = 1'-0"



2 Elevation Section - 1911 As Built
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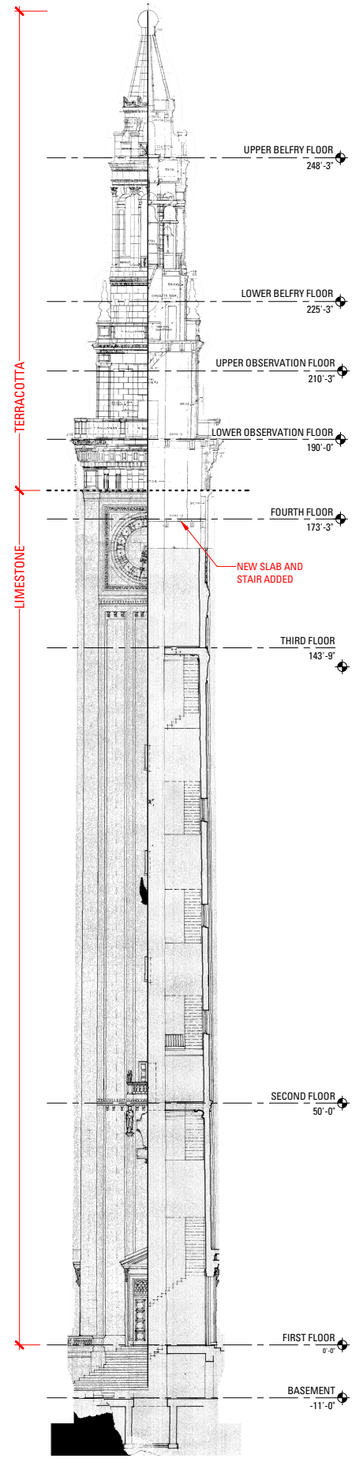

3 Elevation Section - 1966 Reconstruction
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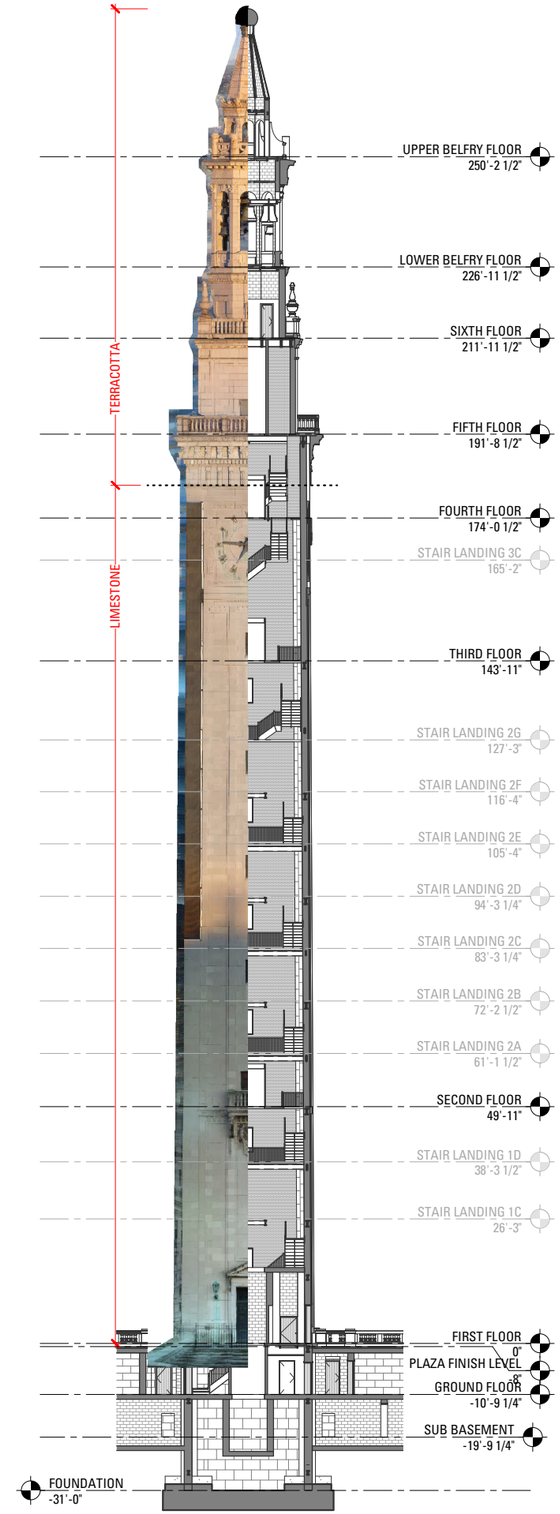

4 2018 Present Day
SCALE: 1/16" = 1'-0"

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Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

CONSTRUCTION AND RENOVATION TIMELINE

A-301E

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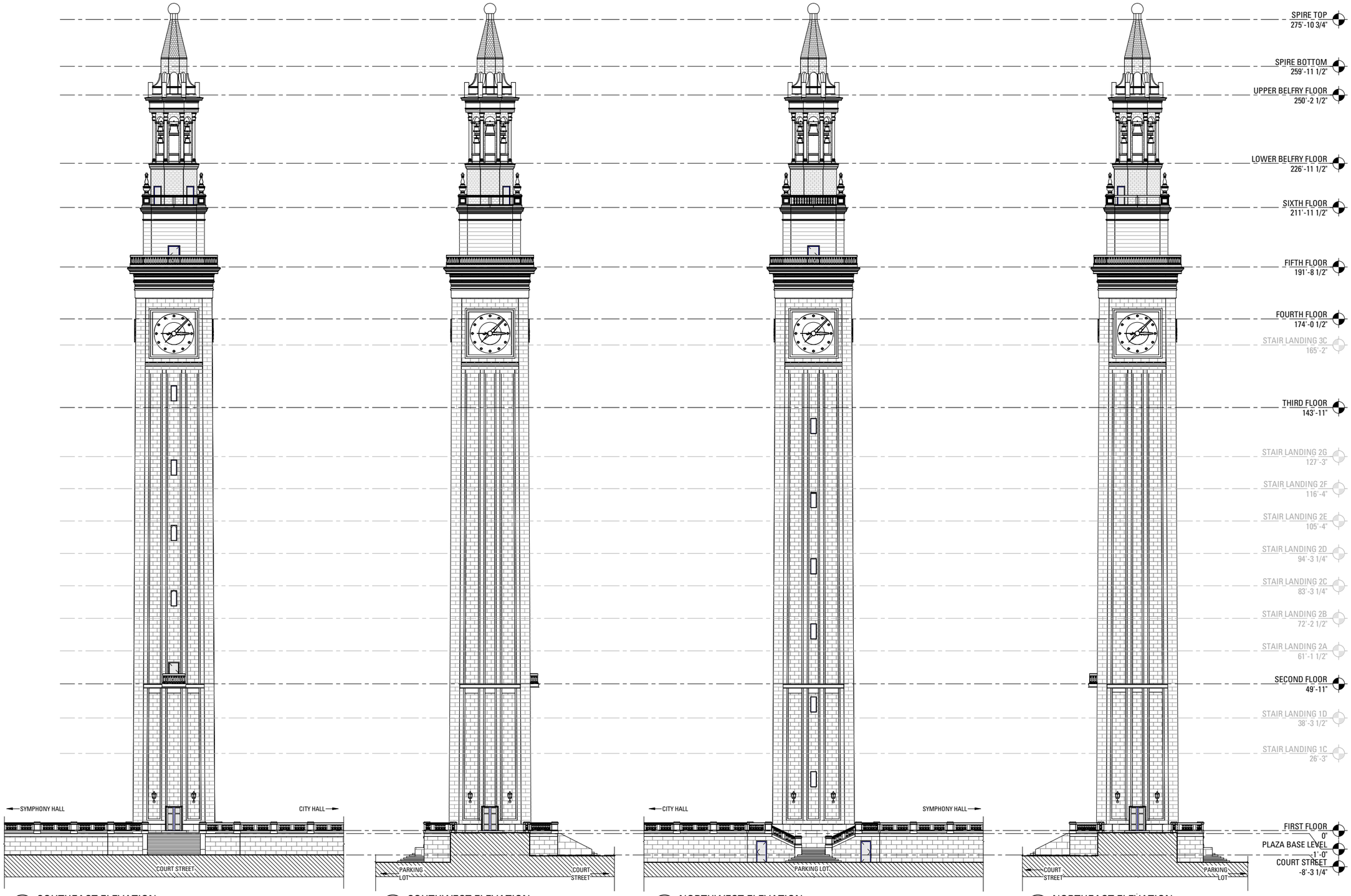

1 SOUTHEAST ELEVATION
SCALE: 1/16" = 1'-0"

2 SOUTHWEST ELEVATION
SCALE: 1/16" = 1'-0"

3 NORTHWEST ELEVATION
SCALE: 1/16" = 1'-0"

4 NORTHEAST ELEVATION
SCALE: 1/16" = 1'-0"

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Date	8 NOV 2019
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Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

EXTERIOR ELEVATIONS

A-302E

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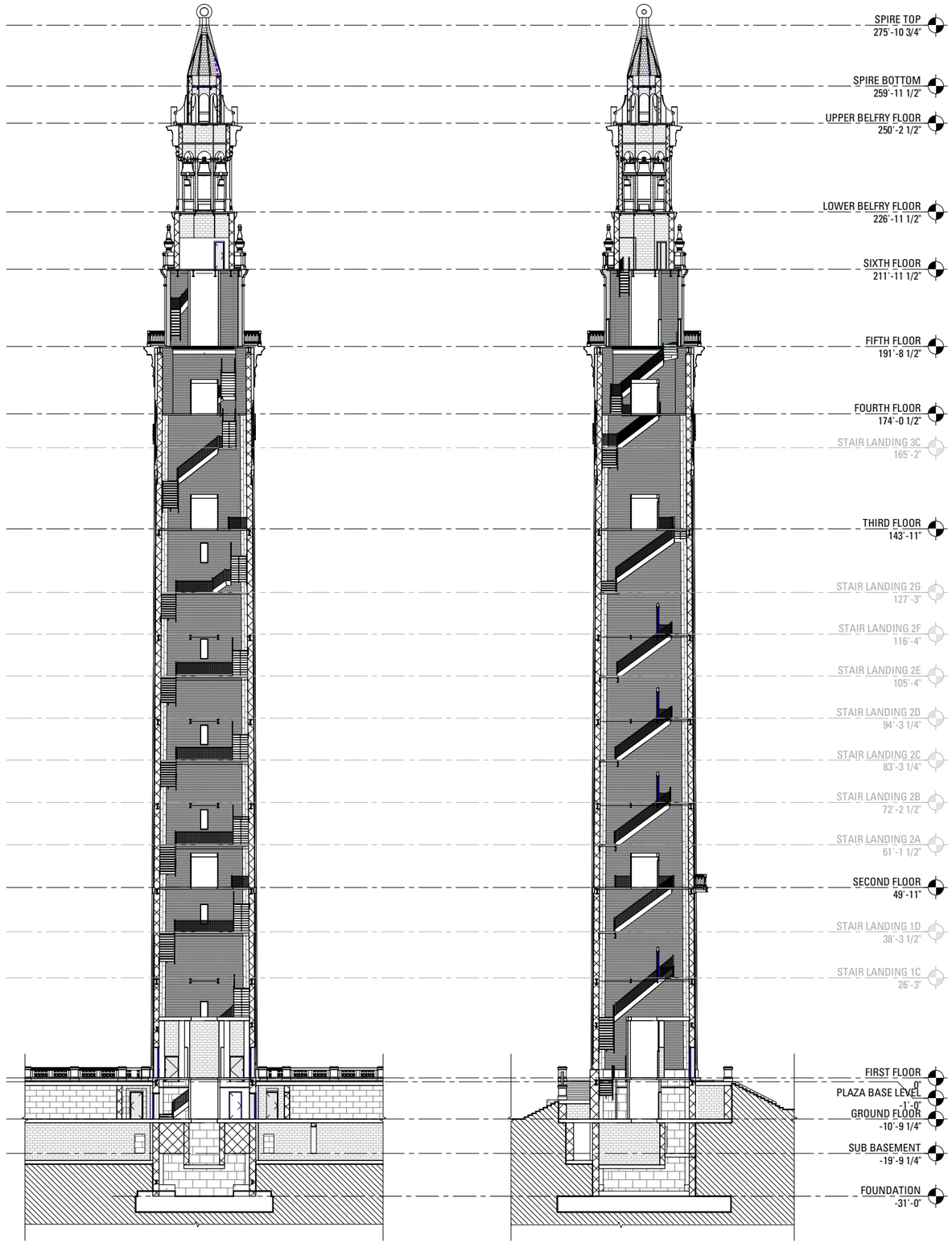

1 SECTION 1 - SOUTHWEST TO NORTHEAST
SCALE: 1/16" = 1'-0"

2 SECTION 2 - NORTHWEST TO SOUTHEAST
SCALE: 1/16" = 1'-0"

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Rev	Date	Remarks

Date	8 NOV 2019
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Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

SECTIONS

A-303E

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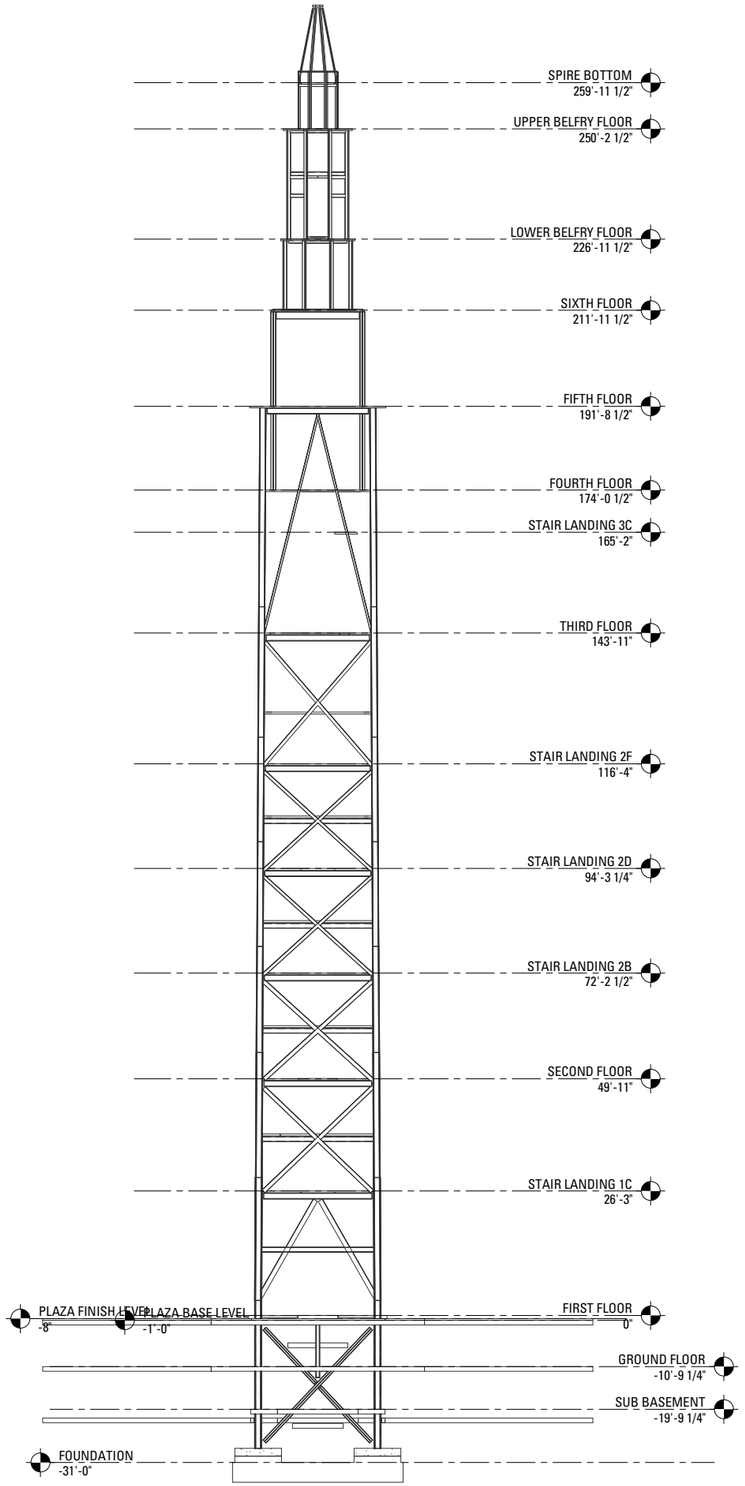

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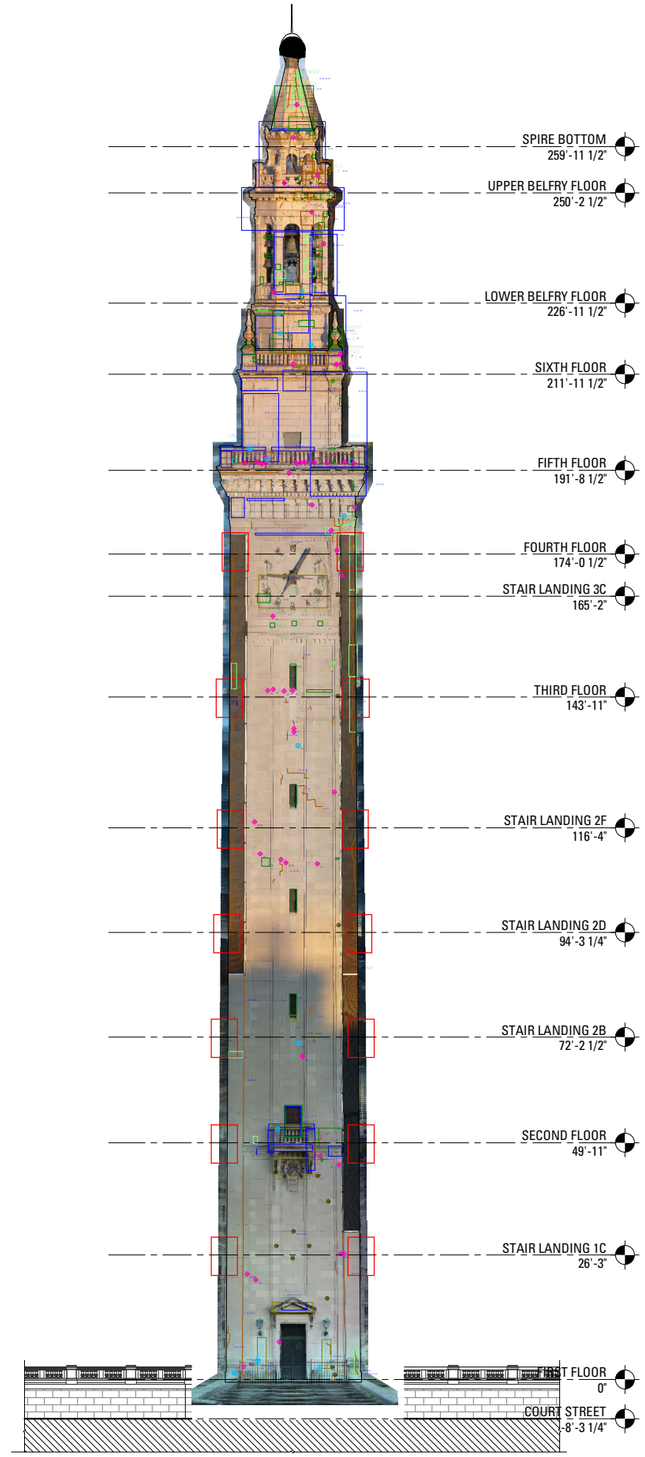

3 SE Elevation VA Overlay
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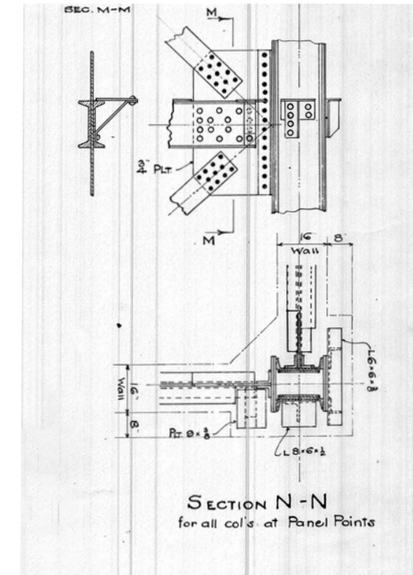

2 Limestone Relieving Plate Detail
SCALE: 1/2" = 1'-0"

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Rev	Date	Remarks

Date	8 NOV 2019
Scale	As indicated
Project Number	18.016
Drawn By	MS

INVESTIGATIONS & DISCOVERY

STRUCTURAL AND FACADE - ANALYSIS

A-605E

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.
11/6/2019 8:42:23 PM

Investigations/Discovery Phase Report for the

Campanile Repairs & Restoration Project

for the

City of Springfield
Department of Capital Asset Construction

36 Court Street
Springfield MA 01103

City Contract No: 20180711
RFQ No. 17-054

Architect
Bruner/Cott Architects
225 Friend Street, Suite 701
Boston MA 02114

Consultants
Vertical Access LLC
Silman
Buidling Conservation Associates, Inc.
Simpson Gumpertz & Heger, Inc.
AKF Group LLC
BLW Engineers, Inc.
Lerch Bates. Inc.
Verdin Bells & Clocks
Collaborative Lighting

Appendix

Funding for the Campanile Study was assisted by the people of Springfield through the Community Preservation Act.

November 8, 2019

Image: Excerpt from Architecture, The Professional Architectural Monthly, June 1914

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  - Priority 2 and 3 Condition Photography
  - Annotated Drawings
  - Spreadsheets of Survey Conditions
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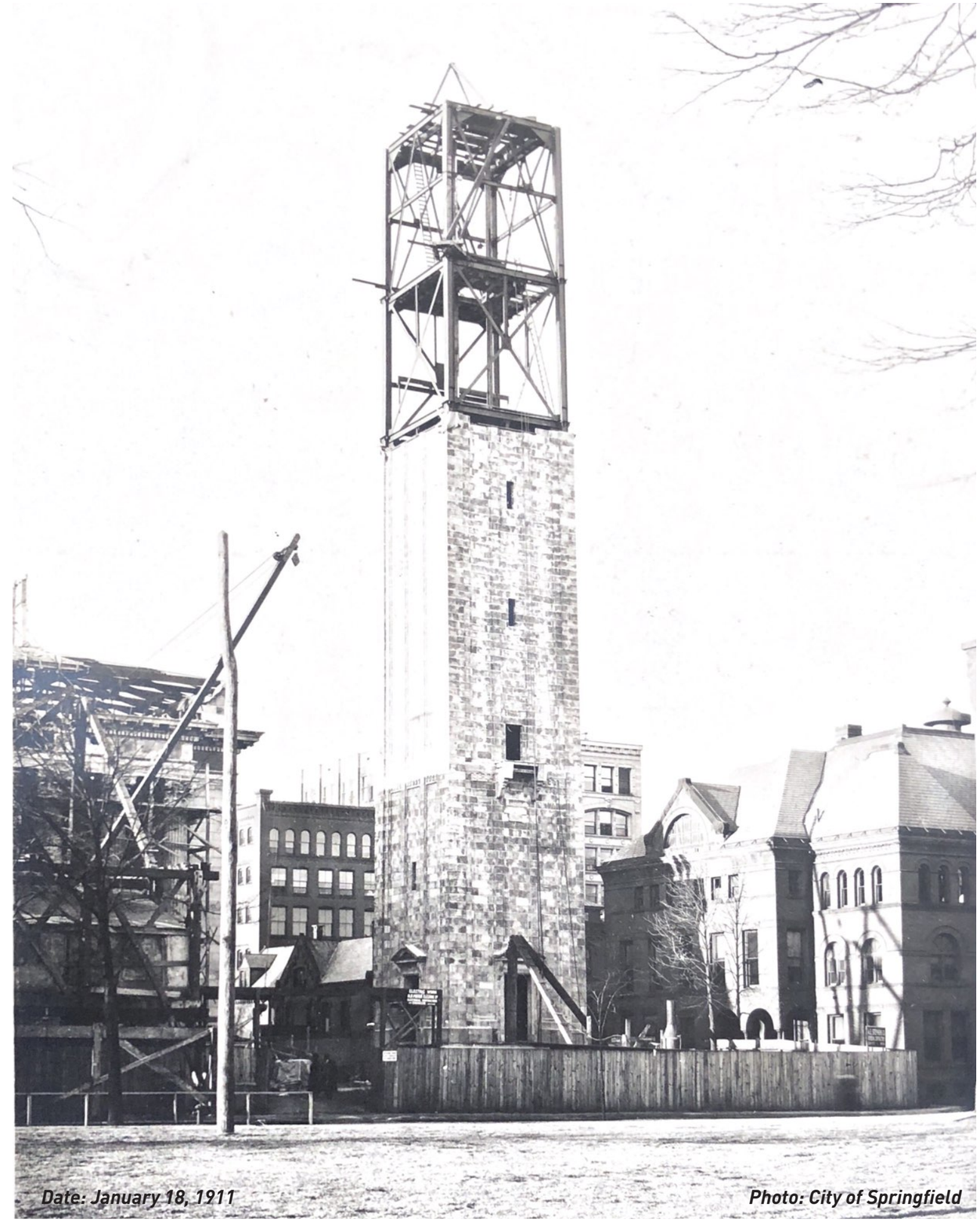
- **Archival Research** *(Vertical Access LLC)*
  - Developmental History
  - Bibliography

- **Select Historical Documents**
  - Architctural Drawings *(Pell and Corbett, 1908)*
  - Editorial *(Architecture, The Professional Architectural Monthly, 1914)*
  - Architectural Drawings *(Hoyle, Doran, and Berry Architects, 1966)*
  - News Clippings



Date: January 18, 1911 *Photo: City of Springfield*

Existing Conditions

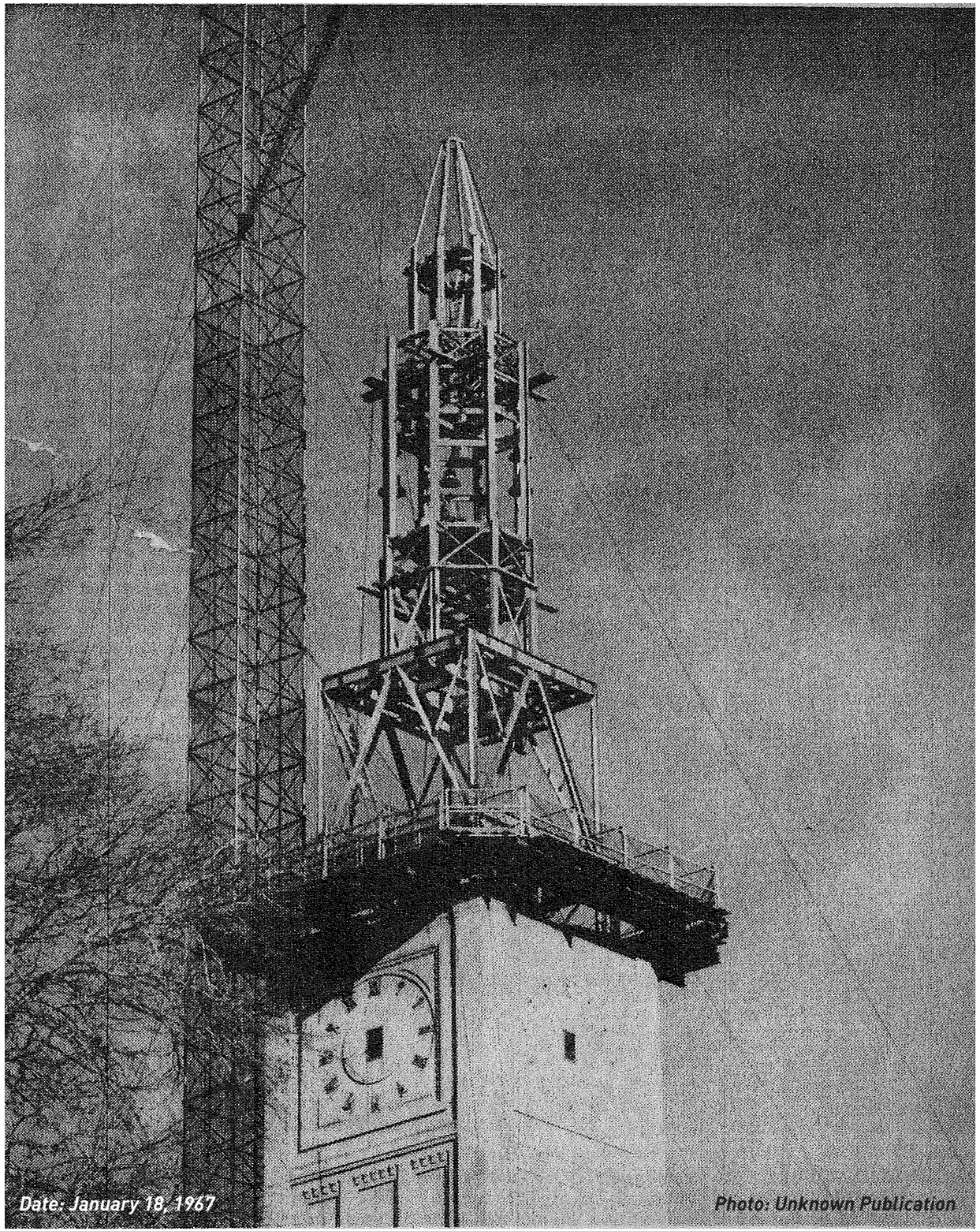
Vertical Access LLC

P.O. Box 4135
Ithaca, NY 14852

Project Team:

Kelly Streeter PE
Kristin Olson

- Priority 1 Condition Photography
- Priority 2 and 3 Condition Photography
- Annotated Drawings
- Spreadsheets of Survey Conditions
- TPAS User Manual



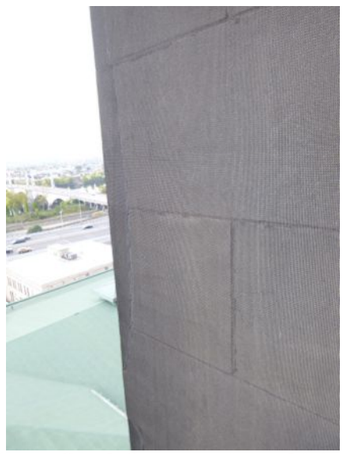
Date: January 18, 1967

Photo: Unknown Publication

Photographs

18-113 Stone_Crack System units and joints 2018-1

18-113 Stone_Crack System units and joints 2018-2



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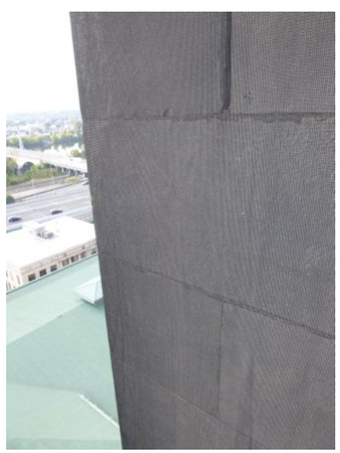
18-138 Stone_Crack System units and joints 2018-2



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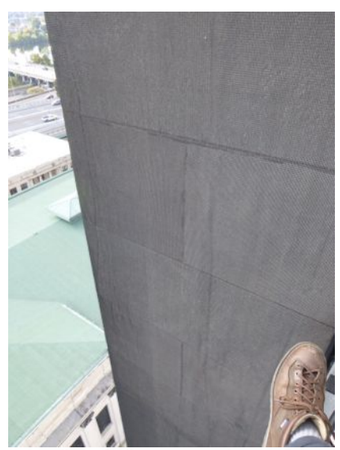

18-151 Stone_Crack System units and joints 2018-2

Springfield Campanile
Priority 1 Conditions
Springfield, MA

Vertical Access LLC
Project Number 16-1935
November 16, 2018

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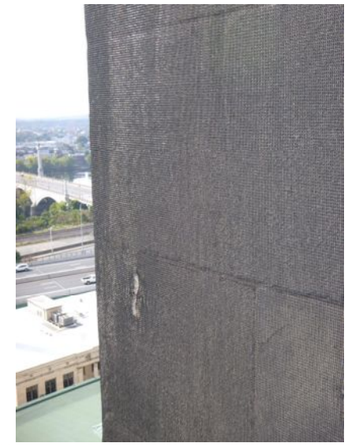

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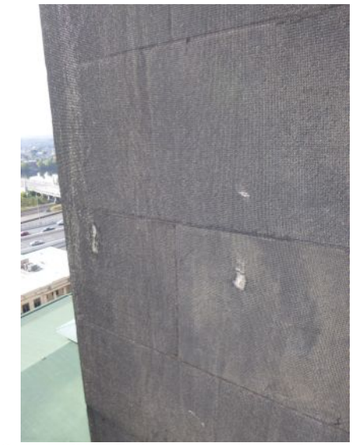
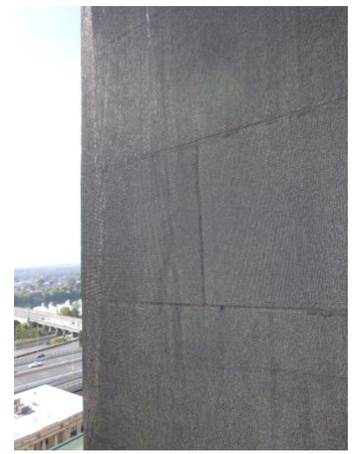
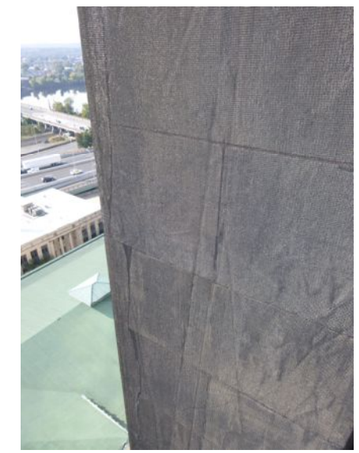


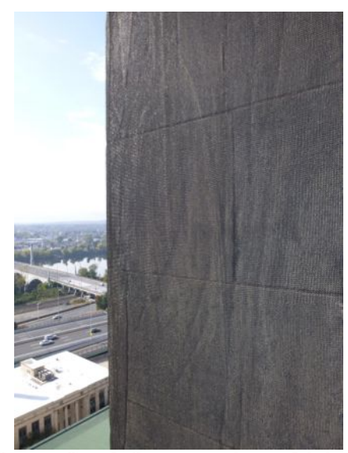
18-169 Stone_Crack System units and joints 2018-1



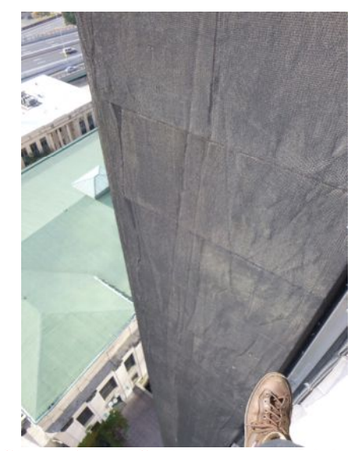
18-169 Stone_Crack System units and joints 2018-2



18-183 Stone_Crack System units and joints 2018-1



18-183 Stone_Crack System units and joints 2018-2



18-183 Stone_Crack System units and joints 2018-3

Springfield Campanile
Priority 1 Conditions
Springfield, MA

Vertical Access LLC
Project Number 16-1935
November 16, 2018

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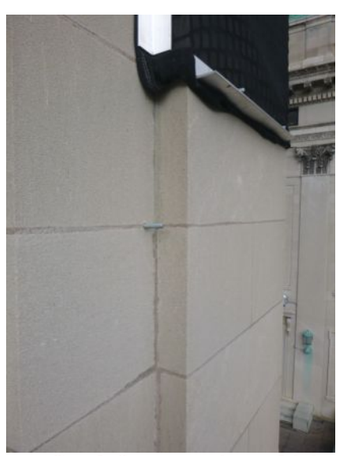
33-186 Glass_Unsecured Loose 2018-1

33-186 Glass_Unsecured Loose 2018-2

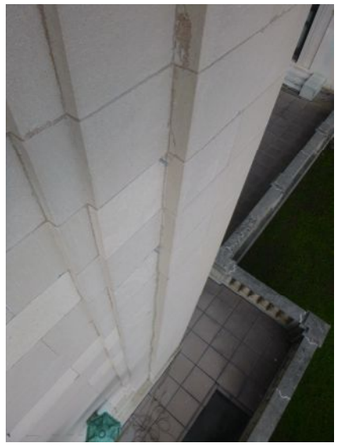
38-190 Stone_Spall Incipient 2018-1

39-186 Stone_Spall Bonded 2018-1

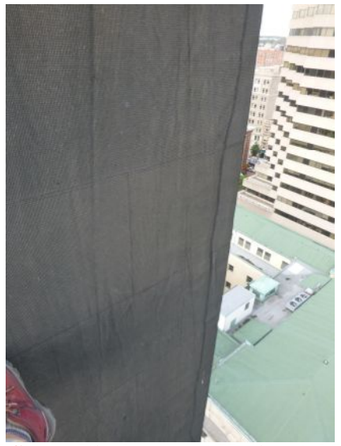


41-42 Stone_Crack System units and joints 2018-1

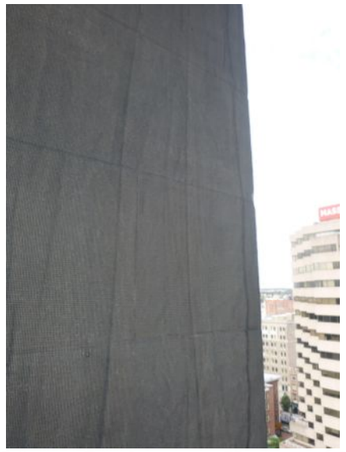
41-42 Stone_Crack System units and joints 2018-2



41-42 Stone_Crack System units and joints 2018-3



42-165 Stone_Displacement Horizontal 2018-1



42-165 Stone_Displacement Horizontal 2018-2

103-127 Stone_Crack System units and joints 2018-1

103-127 Stone_Crack System units and joints 2018-2

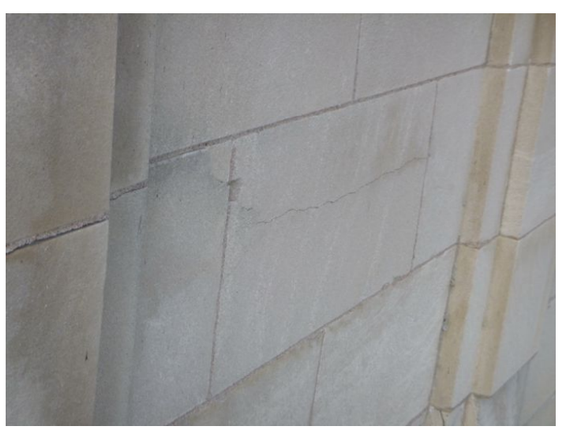
103-127 Stone_Crack System units and joints 2018-4

103-127Stone_Crack System units and joints 2018-3

103-129 Stone_Crack System units and joints 2018-1

103-129 Stone_Crack System units and joints 2018-2

103-129 Stone_Crack System units and joints 2018-3



103-129 Stone_Crack System units and joints 2018-4

105-132 Stone_Spall Incipient 2018-1

106-158 Stone_Spall Incipient 2018-1

107-128 Stone_Repair Patch Failed 2018-1

107-128 Stone_Spall Missing 2018-1

113-271 TerraCotta_Spall Bonded 2018-1

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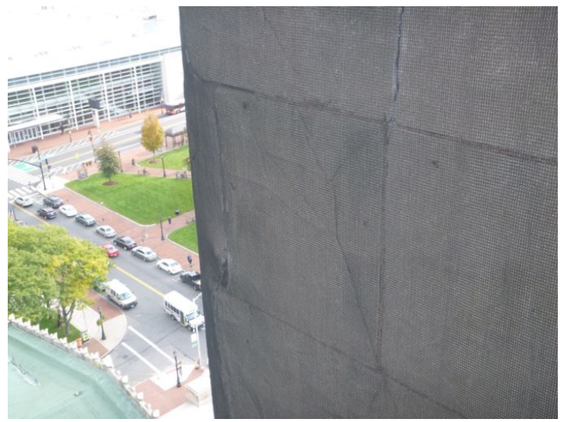
115-258 TerraCotta_Spall Bonded 2018-1

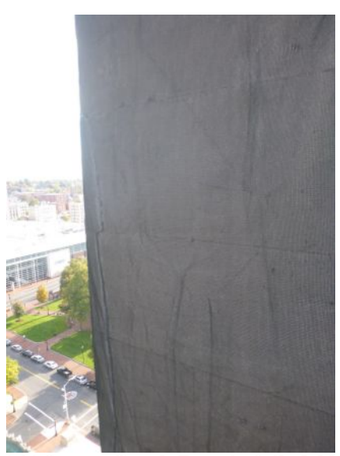
177-150 Stone_Crack Repair failed 2018-1

177-150 Stone_Crack Repair failed 2018-2

177-150 Stone_Crack Repair failed 2018-3



178-152 Stone_Displacement Horizontal 2018-1



178-164 Stone_Crack Repair failed 2018-1

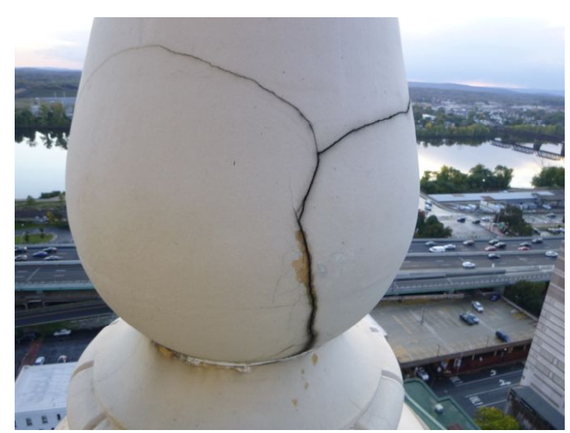
188-271 TerraCotta_Spall Hazardous 2018-1

189-257 TerraCotta_Crack Single unit 2018-1

189-257 TerraCotta_Crack Single unit 2018-2

191-274 TerraCotta_Spall Hazardous 2018-1

192-274 TerraCotta_Crack System units and joints 2018-1



198-232 TerraCotta_Crack Single unit 2018-1

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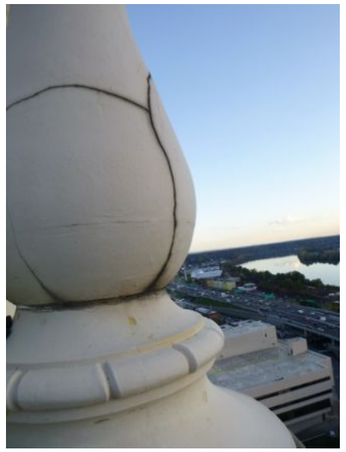
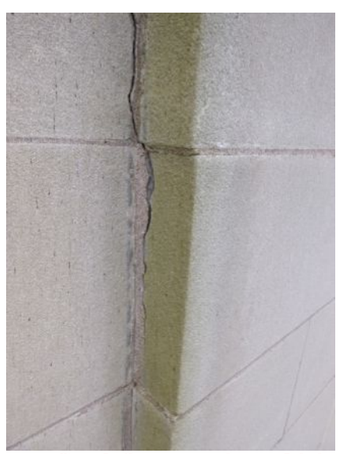
198-232 TerraCotta_Crack Single unit 2018-3

198-232 TerraCotta_Crack Single unit 2018-4



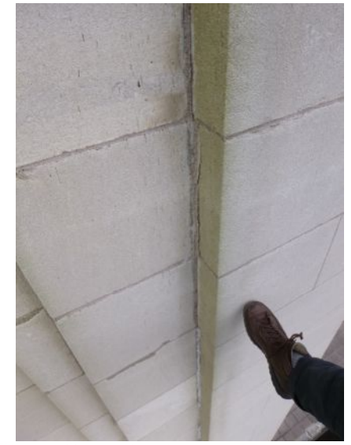
198-232 TerraCotta_Crack Single unit 2018-5

199-87 Stone_Crack System units and joints 2018-1



199-87 Stone_Crack System units and joints 2018-2

199-87 Stone_Crack System units and joints 2018-3



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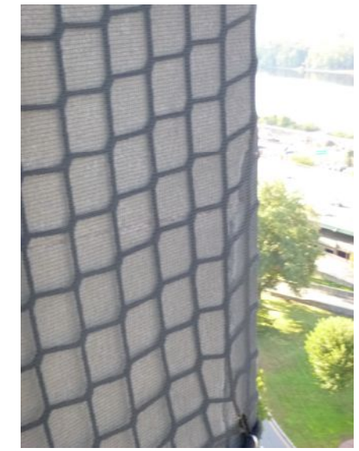
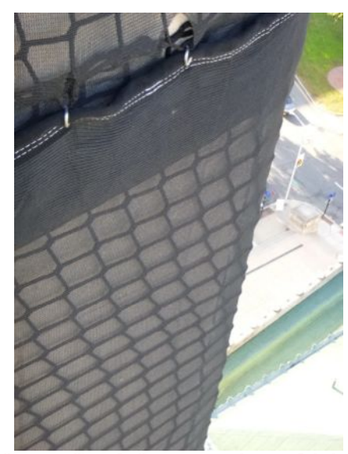
201-114 Stone_Crack System units and joints 2018-1

201-114 Stone_Crack System units and joints 2018-2

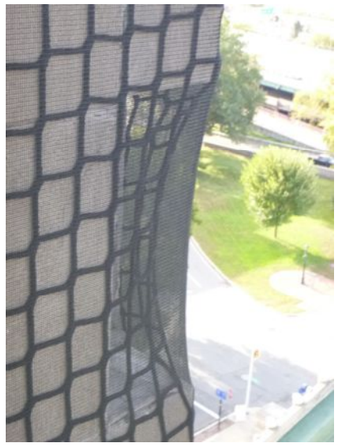


201-160 Stone_Crack System units and joints 2018-1



201-160 Stone_Crack System units and joints 2018-2

202-96 Stone_Crack System units and joints 2018-1



202-124 Stone_Spall Hazardous 2018-1

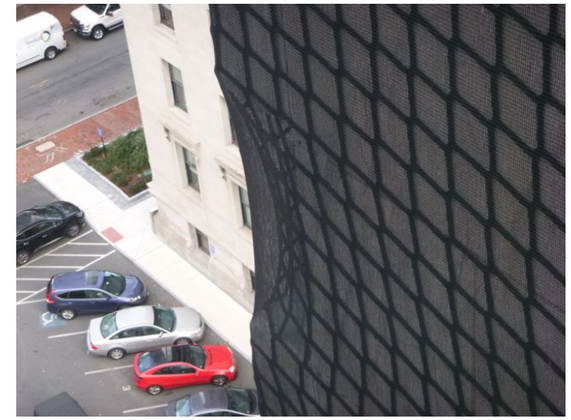
202-148 Stone_Crack System units and joints 2018-1

202-148 Stone_Crack System units and joints 2018-2

202-183 Stone_Crack System units and joints 2018-1

202-183 Stone_Crack System units and joints 2018-2

256-128 Stone_Unsecured Missing 2018-1



256-128 Stone_Unsecured Missing 2018-2

260-135 Stone_Displacement Horizontal 2018-1

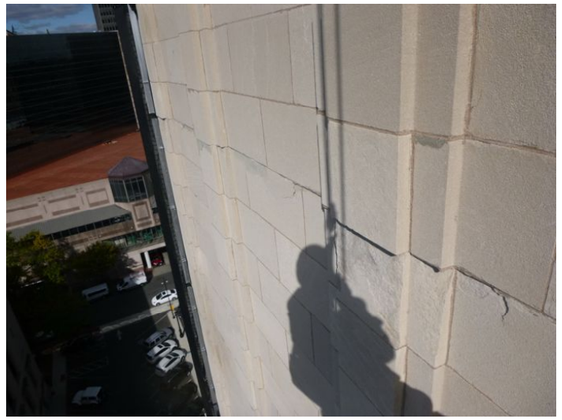
260-135 Stone_Displacement Horizontal 2018-2

261-109 Stone_Spall Missing 2018-1

261-109 Stone_Spall Missing 2018-2

261-109 Stone_Spall Missing 2018-3

268-274 TerraCotta_Spall Hazardous 2018-1



269-130 Stone_Spall Hazardous 2018-1

269-130 Stone_Spall Hazardous 2018-2

269-130 Stone_Spall Hazardous 2018-3

269-130 Stone_Spall Hazardous 2018-4

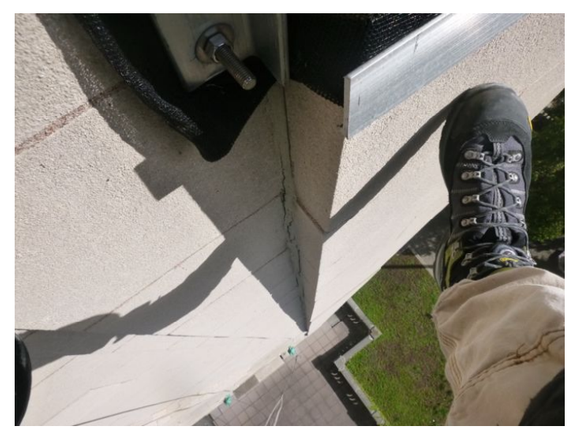
269-130 Stone_Spall Hazardous 2018-5

269-130 Stone_Spall Hazardous 2018-6

269-130 Stone_Spall Hazardous 2018-7

269-130 Stone_Spall Hazardous 2018-8

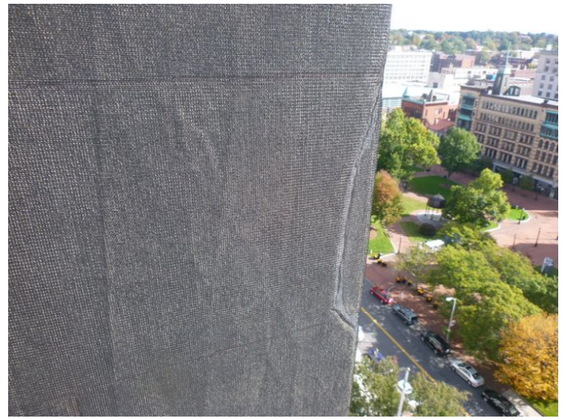
269-256 TerraCotta_Crack Single unit 2018-1



281-92 Stone_Crack System joints 2018-1

281-92 Stone_Crack System joints 2018-2

284-147 Stone_Crack System units and joints 2018-1

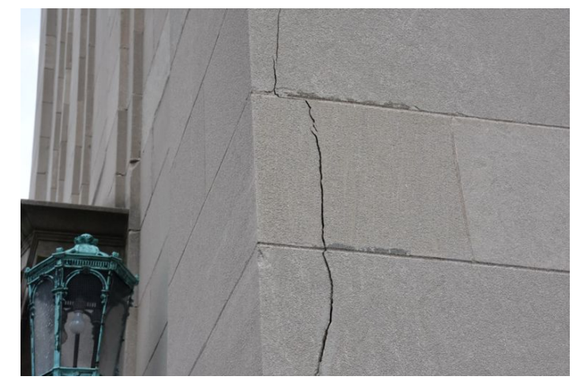


284-147 Stone_Crack System units and joints 2018-2

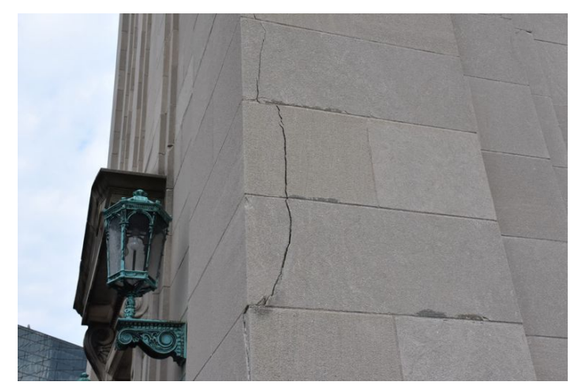
18-22 Stone_Repair Patch Failed 2018-1

18-29 Stone_Crack System units and joints 2018-1

18-29 Stone_Crack System units and joints 2018-2



18-29 Stone_Crack System units and joints 2018-3

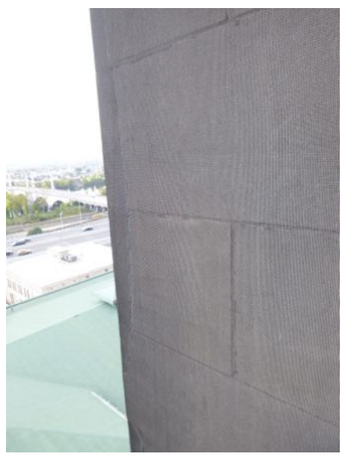


18-29 Stone_Crack System units and joints 2018-4

18-93 Stone_Crack Single unit 2018-1

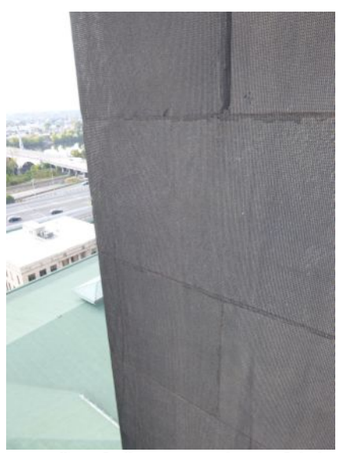
18-113 Stone_Crack System units and joints 2018-1

18-113 Stone_Crack System units and joints 2018-2

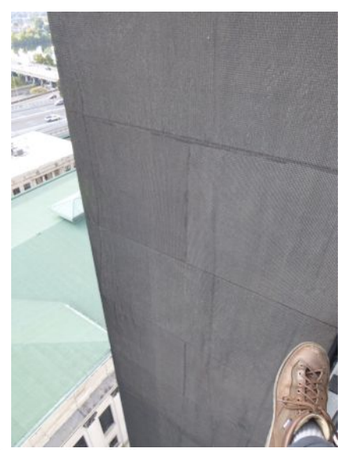


18-138 Stone_Crack System units and joints 2018-1

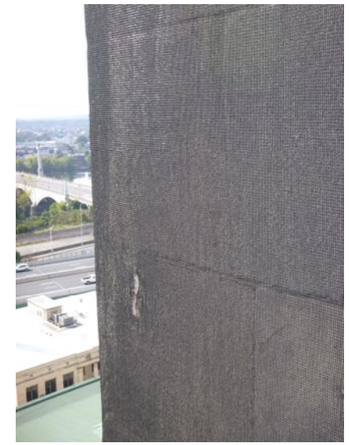
18-138 Stone_Crack System units and joints 2018-2



18-151 Stone_Crack System units and joints 2018-1

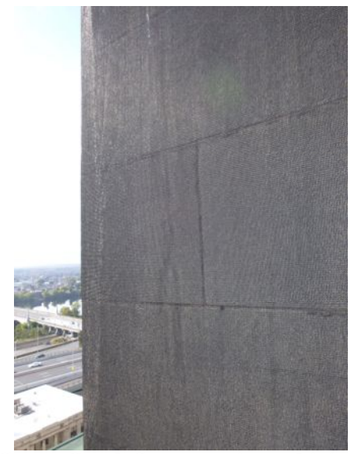


18-151 Stone_Crack System units and joints 2018-2

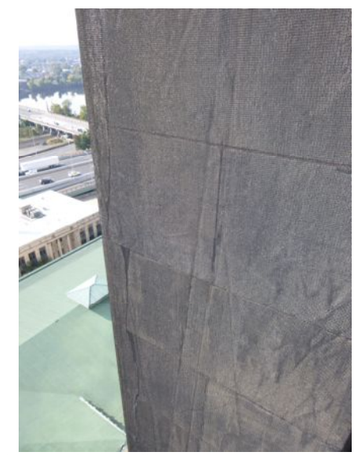


18-162 Stone_Displacement Horizontal 2018-1

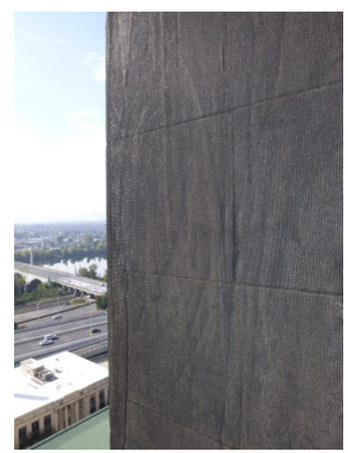
18-169 Stone_Crack System units and joints 2018-1



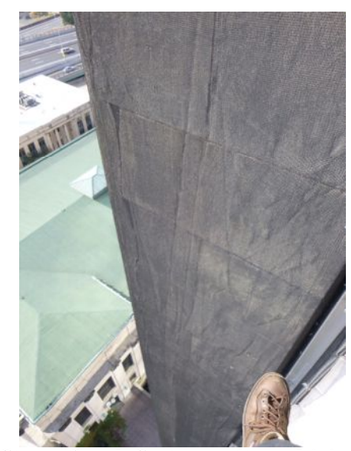
18-169 Stone_Crack System units and joints 2018-2



18-183 Stone_Crack System units and joints 2018-1



18-183 Stone_Crack System units and joints 2018-2



18-183 Stone_Crack System units and joints 2018-3

18-201 TerraCotta_Crack Crazing 2018-1

18-201 TerraCotta_Crack Crazing 2018-2

18-253 TerraCotta_Joints Mortar Caulked Failed 2018-1

18-253 TerraCotta_Joints Mortar Caulked Failed 2018-2

18-253 TerraCotta_Joints Mortar Caulked Failed 2018-3

18-253 TerraCotta_Joints Mortar Caulked Failed 2018-4

18-253 TerraCotta_Joints Mortar Caulked Failed 2018-5

19-86 Stone_Displacement Horizontal and Vertical 2018-1

19-86 Stone_Displacement Horizontal and Vertical 2018-2

19-86 Stone_Displacement Horizontal and Vertical 2018-3

19-155 Stone_Joints Mortar Missing 2018-1

19-195 TerraCotta_Joints Mortar Caulked Failed 2018-1

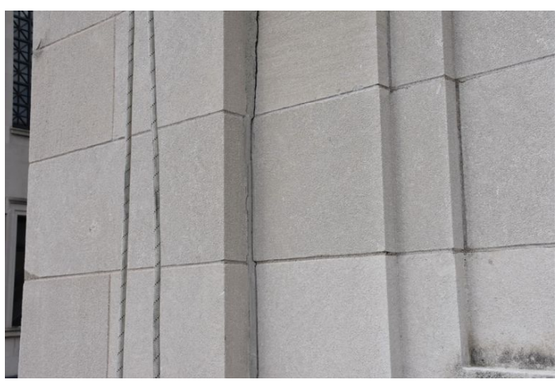
19-195 TerraCotta_Joints Mortar Caulked Failed 2018-2

20-23 Stone_Spall Missing 2018-1

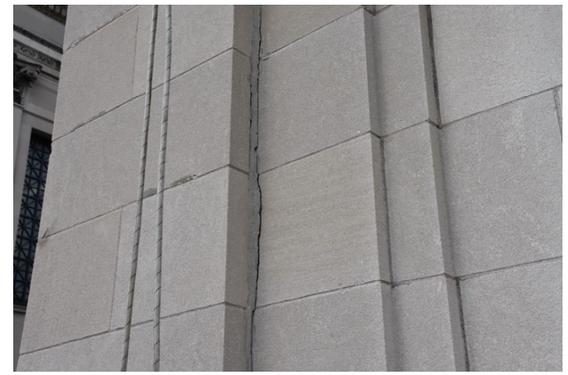
20-23 Stone_Spall Missing 2018-2

20-26 Stone_Crack System units and joints 2018-1

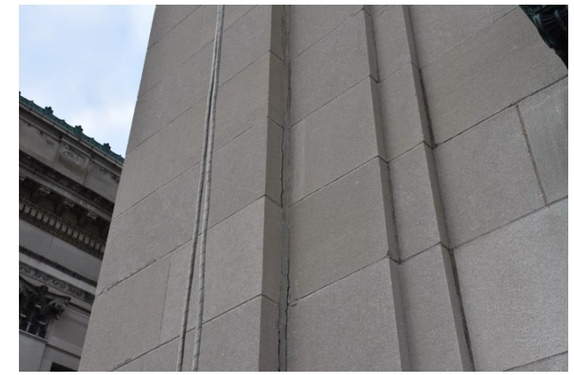
20-26 Stone_Crack System units and joints 2018-2



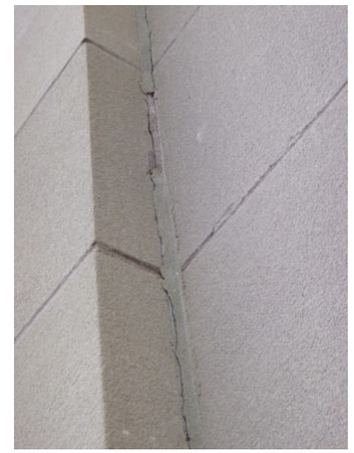
20-26 Stone_Crack System units and joints 2018-3



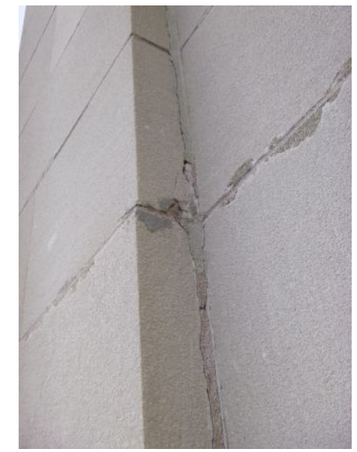
20-26 Stone_Crack System units and joints 2018-4



20-26 Stone_Crack System units and joints 2018-5



20-35 Stone_Crack System joints 2018-1



20-35 Stone_Crack System joints 2018-2

20-35 Stone_Crack System joints 2018-3

20-81 Stone_Crack System joints 2018-1

20-81 Stone_Crack System joints 2018-2

20-81 Stone_Crack System joints 2018-3

20-205 TerraCotta_Crack Crazing 2018-1

20-205 TerraCotta_Crack Crazing 2018-2

20-205 TerraCotta_Crack Crazing 2018-3

21-42 Stone_Spall Removed 2018-1

21-42 Stone_Spall Removed 2018-2

21-97 Stone_Crack System joints 2018-1

21-97 Stone_Crack System joints 2018-2

21-97 Stone_Crack System joints 2018-3

21-203 TerraCotta_Spall Missing 2018-1

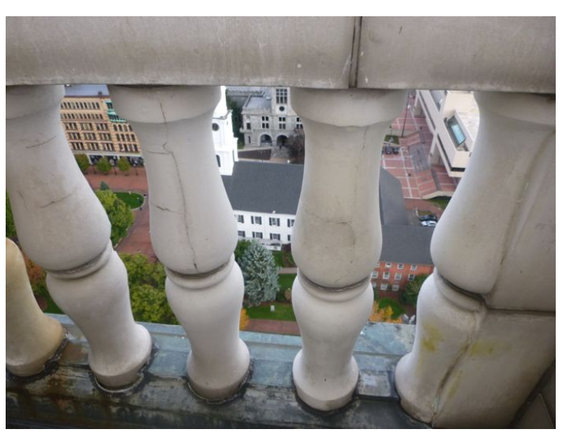
21-224 TerraCotta_Joints Mortar Caulked Failed 2018-1

21-224 TerraCotta_Joints Mortar Caulked Failed 2018-2

21-224 TerraCotta_SurfLoss Glaze loss 2018-1

21-226 TerraCotta_SurfLoss Glaze loss 2018-1

21-226 TerraCotta_SurfLoss Glaze loss 2018-2



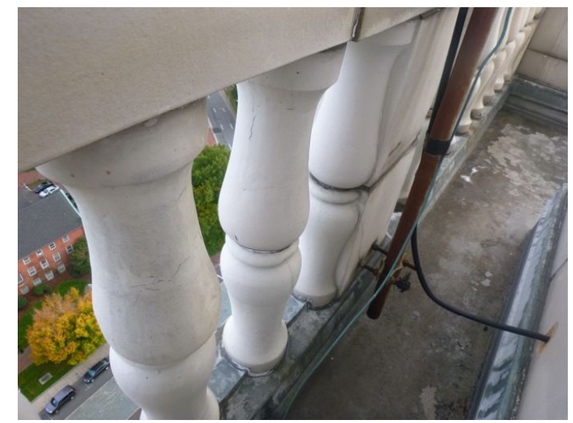
21-227 TerraCotta_Note Photo-cracks at balusters 2018-1

21-227 TerraCotta_Note Photo-cracks at balusters 2018-2

21-227 TerraCotta_Note Photo-cracks at balusters 2018-3

21-227 TerraCotta_Note Photo-cracks at balusters 2018-4

21-227 TerraCotta_Note Photo-cracks at balusters 2018-5



21-227 TerraCotta_Note Photo-cracks at balusters 2018-6

21-227 TerraCotta_Note Photo-cracks at balusters 2018-7

21-227 TerraCotta_Note Photo-cracks at balusters 2018-8

21-227 TerraCotta_Note Photo-cracks at balusters 2018-9

21-227 TerraCotta_Note Photo-cracks at balusters 2018-10

22-132 Stone_Spall Removed 2018-1

22-132 Stone_Spall Removed 2018-2

22-191 Stone_Crack System joints 2018-1

22-202 SheetMetal_Seam Solder Failed 2018-1

22-202 SheetMetal_Seam Solder Failed 2018-2

22-206 TerraCotta_Repair Patch Failed 2018-1

22-219 TerraCotta_Joints Mortar Caulked Failed 2018-1

22-219 TerraCotta_Joints Mortar Caulked Failed 2018-2

22-219 TerraCotta_Joints Mortar Caulked Failed 2018-3

22-219 TerraCotta_Joints Mortar Caulked Failed 2018-4

22-224 TerraCotta_SurfLoss Glaze loss 2018-1

22-226 TerraCotta_Crack System units and joints 2018-1

22-230 TerraCotta_Crack Crazing 2018-1

22-230 TerraCotta_Crack Crazing 2018-2

23-24 Stone_Repair Patch Failed 2018-1

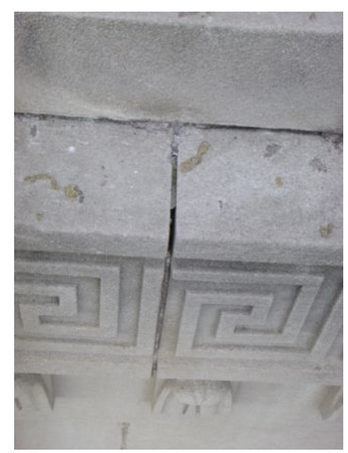
23-25 Stone_Crack System units and joints 2018-1

23-25 Stone_Crack System units and joints 2018-2

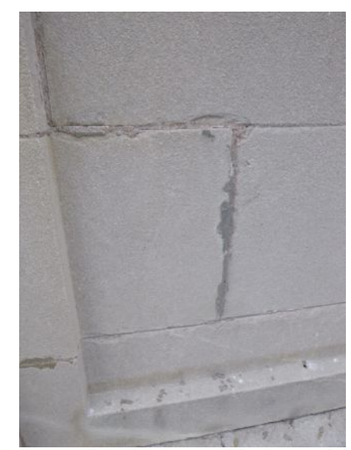
23-25 Stone_Crack System units and joints 2018-3

23-25 Stone_Crack System units and joints 2018-4

23-40 Stone_Spall Missing 2018-1



23-66 Stone_Joints Mortar Missing 2018-1



23-69 Stone_Displacement Horizontal 2018-1

23-69 Stone_Displacement Horizontal 2018-2

23-204 TerraCotta_Spall Missing 2018-1

23-224 TerraCotta_SurfLoss Glaze loss 2018-1

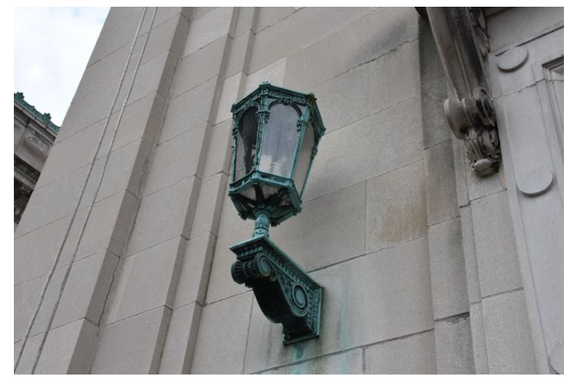
23-228 TerraCotta_Crack Single unit 2018-1

23-233 TerraCotta_Crack Crazing 2018-1

23-233 TerraCotta_Crack Crazing 2018-2

24-24 Stone_SoilStain Copper 2018-1

24-24 Stone_SoilStain Copper 2018-2



24-30 ArchMetal_Note Photo-general 2018-1

24-125 Stone_Spall Bonded 2018-1

24-203 TerraCotta_Spall Bonded 2018-1

24-214 TerraCotta_Joints Mortar Caulked Failed 2018-1

24-214 TerraCotta_Joints Mortar Caulked Failed 2018-2

24-222 SheetMetal_Seam Solder Failed 2018-1

24-222 SheetMetal_Seam Solder Failed 2018-2

24-224 TerraCotta_Crack Single unit 2018-1

24-234 TerraCotta_Displacement Horizontal 2018-1

24-234 TerraCotta_Displacement Horizontal 2018-2

24-235 TerraCotta_SoilStain Copper 2018-1

24-240 TerraCotta_Coating Coating Failed 2018-1

25-124 Stone_SurfLoss Eroded 2018-1

25-124 Stone_SurfLoss Eroded 2018-2

25-158 Stone_Spall Incipient 2018-1

25-175 Stone_SoilStain Copper 2018-1

25-175 Stone_SoilStain Copper 2018-2

25-175 Stone_SoilStain Copper 2018-3

25-175 Stone_SoilStain Copper 2018-4

25-175 Stone_SoilStain Copper 2018-5

25-177 Stone_SurfLoss Eroded 2018-1

25-178 Glass_Crack Cracked pane 2018-1

25-203 TerraCotta_Spall Removed 2018-1

25-203 TerraCotta_Spall Removed 2018-2

25-204 TerraCotta_Repair Patch Failed 2018-1

25-205 TerraCotta_Spall Incipient 2018-1

25-226 TerraCotta_Crack System units 2018-1

25-226 TerraCotta_Crack System units 2018-2

25-226 TerraCotta_Crack System units 2018-3

25-226 TerraCotta_Crack System units 2018-4

25-226 TerraCotta_Crack System units 2018-5

25-226 TerraCotta_Crack System units 2018-6

25-235 TerraCotta_Crack Single unit 2018-1

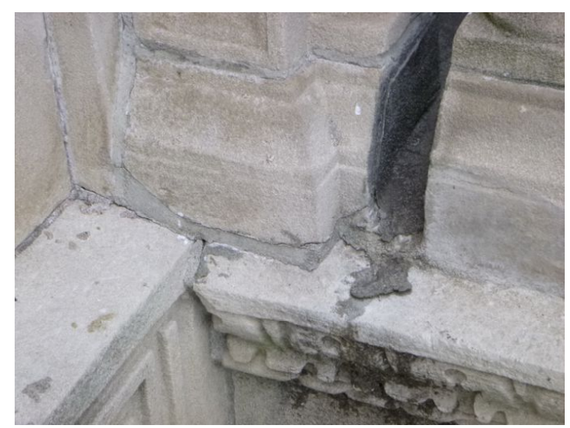
25-235 TerraCotta_Crack Single unit 2018-2

25-245 ArchMetal_Coating Coating Failed 2018-1

25-248 ArchMetal_Coating Coating Failed 2018-1

25-248 ArchMetal_Coating Coating Failed 2018-2

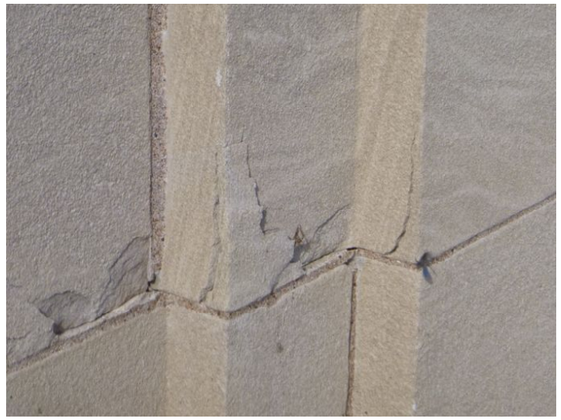
26-69 Stone_Joints Mortar Failed 2018-1



26-69 Stone_Joints Mortar Failed 2018-2

26-69 Stone_Joints Mortar Failed 2018-3

26-121 Stone_Crack Single unit 2018-1



26-158 Stone_Spall Incipient 2018-1

26-173 Stone_Spall Bonded 2018-1

26-226 TerraCotta_Crack Single unit 2018-1

26-228 TerraCotta_SurfLoss Glaze loss 2018-1

26-228 TerraCotta_SurfLoss Glaze loss 2018-2

26-228 TerraCotta_SurfLoss Glaze loss 2018-3

26-231 TerraCotta_Joints Mortar Caulked Failed 2018-1

26-231 TerraCotta_Joints Mortar Caulked Failed 2018-2

26-237 TerraCotta_Spall Missing 2018-1

27-28 Stone_Spall Missing 2018-1

27-35 Stone_SoilStain Biological 2018-1

27-35 Stone_SoilStain Biological 2018-2

27-66 Stone_Joints Mortar Failed 2018-1

27-66 Stone_Joints Mortar Failed 2018-2

27-66 Stone_Joints Mortar Failed 2018-3

27-66 Stone_Joints Mortar Failed 2018-4

27-71 Stone_Joints Sealant Failed 2018-1

27-71 Stone_Joints Sealant Failed 2018-2

27-71 Stone_Joints Sealant Failed 2018-3

27-71 Stone_Repair Dutchman Failed 2018-1

27-186 Glass_Unsecured Missing 2018-1

27-225 TerraCotta_SoilStain Rust 2018-1

27-233 TerraCotta_Repair Patch Failed 2018-1

27-235 TerraCotta_Crack Single unit 2018-1

27-236 TerraCotta_Crack Crazing 2018-1

27-242 TerraCotta_Coating Coating Failed 2018-1

27-243 TerraCotta_Displacement Horizontal 2018-1

27-247 TerraCotta_Joints Mortar Caulked Failed 2018-1

27-247 TerraCotta_Joints Mortar Caulked Failed 2018-2

27-254 TerraCotta_Crack Single unit 2018-1

27-277 TerraCotta_Displacement Horizontal 2018-1

28-32 Stone_SoilStain Biological 2018-1

28-32 Stone_SoilStain Biological 2018-2

28-32 Stone_SoilStain Biological 2018-3

28-61 Stone_SoilStain Atmospheric 2018-1

28-61 Stone_SoilStain Atmospheric 2018-2

28-61 Stone_SoilStain Atmospheric 2018-3

28-61 Stone_SoilStain Atmospheric 2018-4

28-63 Stone_SoilStain Efflorescence 2018-1

28-63 Stone_SoilStain Efflorescence 2018-2

28-63 Stone_SoilStain Efflorescence 2018-3

28-124 Stone_Spall Incipient 2018-1

28-150 Stone_Crack System units and joints 2018-1

28-150 Stone_Crack System units and joints 2018-2

28-150 Stone_Crack System units and joints 2018-3

28-150 Stone_Crack System units and joints 2018-4

28-156 Stone_Crack Single unit 2018-1

28-156 Stone_Crack Single unit 2018-2

28-158 Stone_Spall Incipient 2018-1

28-158 Stone_Spall Incipient 2018-2

28-177 ArchMetal_Corrosion Perforated 2018-1

28-177 ArchMetal_Corrosion Perforated 2018-2

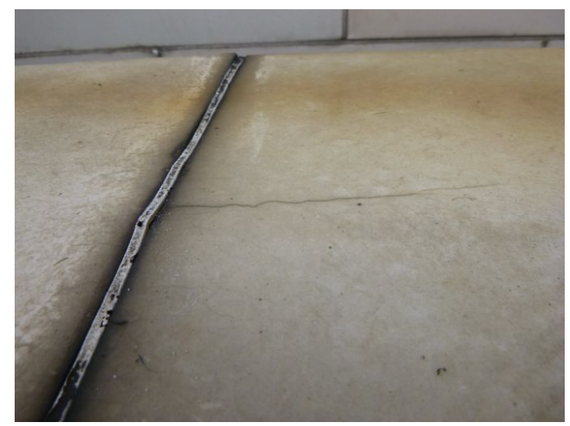
28-199 TerraCotta_Crack Repair failed 2018-1

28-204 TerraCotta_Crack Single unit 2018-1

28-204 TerraCotta_Crack Single unit 2018-2

28-204 TerraCotta_Crack Single unit 2018-3

28-225 TerraCotta_Crack Single unit 2018-1



28-227 TerraCotta_Crack Single unit 2018-1

28-228 TerraCotta_Coating Coating Failed 2018-1

28-228 TerraCotta_Coating Coating Failed 2018-2

28-228 TerraCotta_Coating Coating Failed 2018-3

28-229 TerraCotta_Repair Patch Failed 2018-1

28-230 TerraCotta_Joints Mortar Caulked Failed 2018-1

28-230 TerraCotta_Joints Mortar Caulked Failed 2018-2

28-230 TerraCotta_Joints Mortar Caulked Failed 2018-3

28-236 TerraCotta_Joints Mortar Failed 2018-1

28-236 TerraCotta_Joints Mortar Failed 2018-2

28-241 TerraCotta_SurfLoss Glaze loss 2018-1

28-259 TerraCotta_Spall Removed 2018-1

28-259 TerraCotta_Spall Removed 2018-2

28-267 TerraCotta_SoilStain Rust 2018-1

28-270 SheetMetal_Seam Solder Failed 2018-1

29-123 Stone_Crack System joints 2018-1

29-123 Stone_Crack System joints 2018-2

29-123 Stone_Crack System joints 2018-3

29-124 Stone_Spall Incipient 2018-1

29-124 Stone_Spall Incipient 2018-2

29-152 Stone_Crack Single unit 2018-1

29-152 Stone_Crack Single unit 2018-2

29-183 ArchMetal_Note Photo-southeast clock overall 2018-1

29-183 ArchMetal_Note Photo-southeast clock overall 2018-2

29-183 ArchMetal_Note Photo-southeast clock overall 2018-3

29-183 ArchMetal_Note Photo-southeast clock overall 2018-4

29-183 ArchMetal_Note Photo-southeast clock overall 2018-5

29-183 ArchMetal_Note Photo-southeast clock overall 2018-6

29-183 ArchMetal_Note Photo-southeast clock overall 2018-7

29-188 Stone_Joints Sealant Failed 2018-1

29-188 Stone_Joints Sealant Failed 2018-2

29-188 Stone_Joints Sealant Failed 2018-3

29-188 Stone_Joints Sealant Failed 2018-4

29-200 TerraCotta_Note Photo-general 2018-1

29-200 TerraCotta_Note Photo-general 2018-2

29-200 TerraCotta_Note Photo-general 2018-3

29-201 TerraCotta_Spall Incipient 2018-1

29-205 TerraCotta_Crack Single unit 2018-1

29-225 TerraCotta_Crack Single unit 2018-1

29-227 TerraCotta_Crack Single unit 2018-1

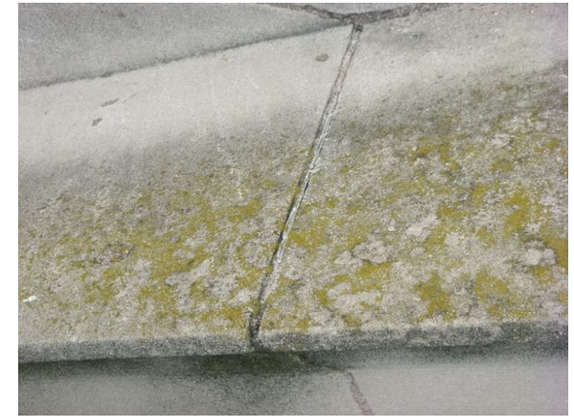
29-241 TerraCotta_SurfLoss Glaze loss 2018-1

29-275 TerraCotta_Crack System units and joints 2018-1

29-275 TerraCotta_Crack System units and joints 2018-2

30-37 Stone_Joints Sealant Failed 2018-1

30-37 Stone_Joints Sealant Failed 2018-2



30-37 Stone_Joints Sealant Failed 2018-3

30-50 Stone_Embedment Ferrous Embedment 2018-1

30-50 Stone_Embedment Ferrous Embedment 2018-2

30-50 Stone_Embedment Ferrous Embedment 2018-3

30-50 Stone_Embedment Ferrous Embedment 2018-4

30-65 Stone_Note Photo-overall 2018-1

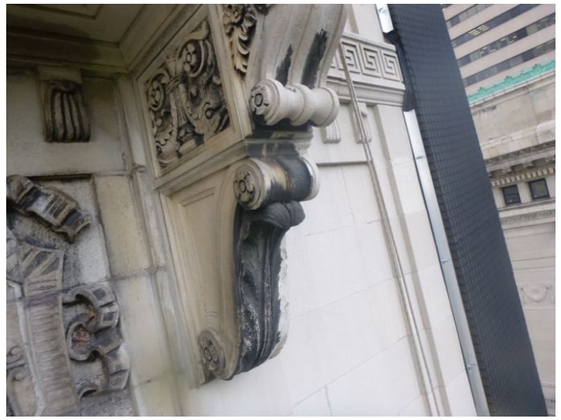
30-65 Stone_Note Photo-overall 2018-2

30-65 Stone_Note Photo-overall 2018-3

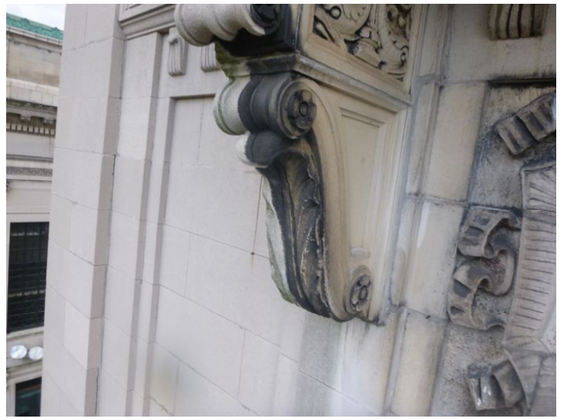
30-65 Stone_Note Photo-overall 2018-4

30-65 Stone_Note Photo-overall 2018-5

30-65 Stone_Note Photo-overall 2018-6



30-65 Stone_Note Photo-overall 2018-7



30-65 Stone_Note Photo-overall 2018-8

30-69 Stone_Crack Single unit 2018-1

30-70 Stone_SoilStain Biological 2018-1

30-70 Stone_SoilStain Biological 2018-2

30-73 Wood_Deteriorated Weathered 2018-1

30-73 Wood_Deteriorated Weathered 2018-2

30-73 Wood_Deteriorated Weathered 2018-3

30-73 Wood_Deteriorated Weathered 2018-4

30-75 Wood_Coating Coating Failed 2018-1

30-75 Wood_Coating Coating Failed 2018-2

30-75 Wood_Coating Coating Failed 2018-3

30-91 Stone_SoilStain Guano 2018-1

30-91 Stone_SoilStain Guano 2018-2

30-97 Wood_Coating Coating Failed 2018-1

30-97 Wood_Coating Coating Failed 2018-2

30-140 Wood_Coating Coating Failed 2018-1

30-140 Wood_Coating Coating Failed 2018-2

30-150 Stone_Spall Incipient 2018-1

30-158 Stone_Spall Incipient 2018-1

30-163 Wood_Coating Coating Failed 2018-1

30-163 Wood_Coating Coating Failed 2018-2

30-168 Stone_Note Photo-general 2018-1

30-168 Stone_Note Photo-general 2018-2

30-168 Stone_Note Photo-general 2018-3

30-168 Stone_Note Photo-general 2018-4

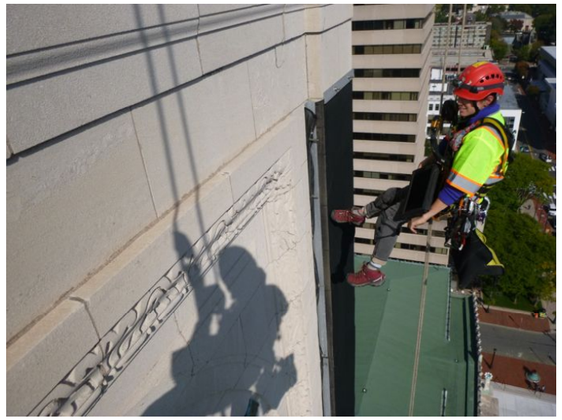
30-168 Stone_Note Photo-general 2018-5

30-191 Stone_Note Photo-general 2018-1

30-191 Stone_Note Photo-general 2018-2

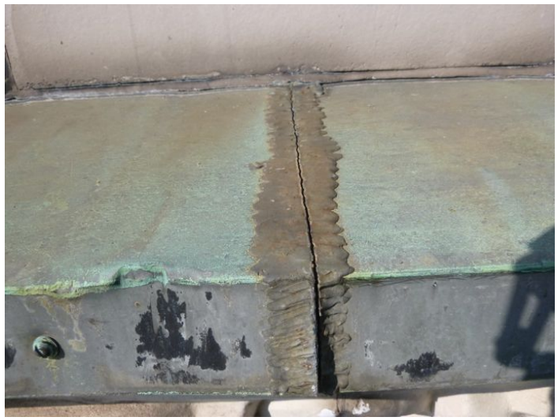
30-191 Stone_Note Photo-general 2018-3

30-191 Stone_Note Photo-general 2018-4



30-191 Stone_Note Photo-general 2018-5

30-199 TerraCotta_Crack Repair failed 2018-1



30-201 SheetMetal_Seam Solder Failed 2018-1

30-204 TerraCotta_Crack Single unit 2018-1

30-207 TerraCotta_Joints Mortar Caulked Failed 2018-1

30-207 TerraCotta_Joints Mortar Caulked Failed 2018-2

30-207 TerraCotta_Joints Mortar Caulked Failed 2018-3

30-221 SheetMetal_Seam Solder Failed 2018-1

30-223 TerraCotta_Spall Missing 2018-1

30-223 TerraCotta_Spall Missing 2018-2

30-224 TerraCotta_Crack Single unit 2018-1

30-224 TerraCotta_Crack Single unit 2018-2

30-232 TerraCotta_Crack Crazing 2018-1

30-232 TerraCotta_Crack Crazing 2018-2

30-232 TerraCotta_Crack Crazing 2018-3

30-235 TerraCotta_Crack System units 2018-1

30-235 TerraCotta_Crack System units 2018-2

30-237 TerraCotta_Crack Crazing 2018-1

30-237 TerraCotta_Crack Crazing 2018-2

30-237 TerraCotta_Crack Crazing 2018-3

30-238 TerraCotta_SoilStain Rust 2018-1

30-238 TerraCotta_SoilStain Rust 2018-2

30-238 TerraCotta_SoilStain Rust 2018-3

30-257 ArchMetal_Note Photo-general 2018-1

30-257 ArchMetal_Note Photo-general 2018-2

30-257 ArchMetal_Note Photo-general 2018-3

30-257 ArchMetal_Note Photo-general 2018-4

30-259 TerraCotta_Note Photo-standing water 2018-1

30-268 TerraCotta_Spall Missing 2018-1

30-268 TerraCotta_Spall Missing 2018-2

30-281 TerraCotta_Crack System units and joints 2018-1

30-281 TerraCotta_Crack System units and joints 2018-2

30-281 TerraCotta_Crack System units and joints 2018-3

30-287 SheetMetal_Note Photo-finial 2018-1

30-287 SheetMetal_Note Photo-finial 2018-2

31-25 ArchMetal_Note Photo-general 2018-1

31-25 ArchMetal_Note Photo-general 2018-2

31-25 ArchMetal_Note Photo-general 2018-3

31-88 Stone_Repair Patch Failed 2018-1

31-143 Stone_Crack System joints 2018-1

31-143 Stone_Crack System joints 2018-2

31-143 Stone_Crack System joints 2018-3

31-147 Stone_Repair Patch Failed 2018-1

31-203 TerraCotta_Spall Incipient 2018-1

31-213 TerraCotta_Note Photo-general 2018-1

31-213 TerraCotta_Note Photo-general 2018-2

31-213 TerraCotta_Note Photo-general 2018-3

31-213 TerraCotta_Note Photo-general 2018-4

31-219 TerraCotta_Joints Mortar Caulked Failed 2018-1

31-219 TerraCotta_Joints Mortar Caulked Failed 2018-2

31-219 TerraCotta_Joints Mortar Caulked Failed 2018-3

31-219 TerraCotta_Joints Mortar Caulked Failed 2018-4

31-227 TerraCotta_Crack System units 2018-1

31-235 TerraCotta_Crack Single unit 2018-1

31-247 TerraCotta_Joints Mortar Caulked Failed 2018-1

31-247 TerraCotta_Joints Mortar Caulked Failed 2018-2

31-247 TerraCotta_Joints Mortar Caulked Failed 2018-3

31-252 TerraCotta_Note Photo-general 2018-1

31-252 TerraCotta_Note Photo-general 2018-2

31-252 TerraCotta_Note Photo-general 2018-3

31-252 TerraCotta_Note Photo-general 2018-4

31-252 TerraCotta_Note Photo-general 2018-5

31-252 TerraCotta_Note Photo-general 2018-6

31-255 TerraCotta_SoilStain Biological 2018-1

31-262 TerraCotta_Crack Crazing 2018-1

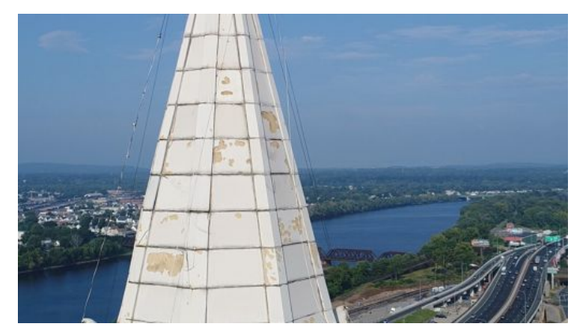
31-262 TerraCotta_Crack Crazing 2018-2

31-265 TerraCotta_Crack Single unit 2018-1

31-265 TerraCotta_Crack Single unit 2018-2

31-267 TerraCotta_Crack Single unit 2018-1

31-267 TerraCotta_Crack Single unit 2018-2



31-275 TerraCotta_Spall Bonded 2018-1

31-282 TerraCotta_Crack System joints 2018-1

31-282 TerraCotta_Crack System joints 2018-2

31-285 ArchMetal_Note Photo-general 2018-1

31-285 ArchMetal_Note Photo-general 2018-2

32-85 Stone_Spall Incipient 2018-1

32-139 Stone_Crack Single unit 2018-1

32-139 Stone_Crack Single unit 2018-2

32-140 Stone_Crack System joints 2018-1

32-155 Stone_Crack Single unit 2018-1

32-166 Stone_Crack Single unit 2018-1

32-166 Stone_Crack Single unit 2018-2

32-204 TerraCotta_Spall Missing 2018-1

32-223 TerraCotta_Crack Single unit 2018-1

32-226 TerraCotta_Crack Single unit 2018-1

32-235 TerraCotta_Crack Single unit 2018-1

32-238 TerraCotta_Repair Patch Failed 2018-1

32-256 TerraCotta_SurfLoss Glaze loss 2018-1

32-262 TerraCotta_SurfLoss Glaze loss 2018-1

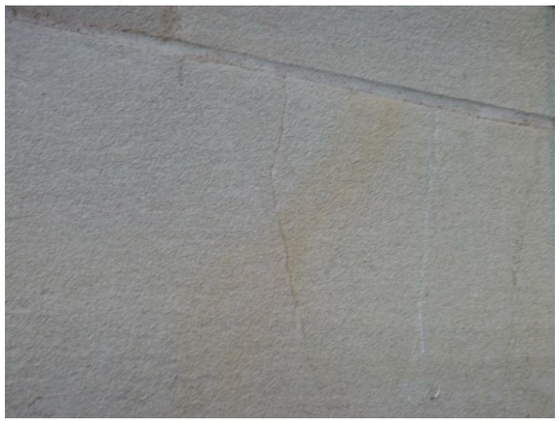
32-267 TerraCotta_SoilStain Rust 2018-1

32-270 SheetMetal_Seam Sealant Failed 2018-1

33-72 Stone_Joints Mortar Failed 2018-1

33-72 Stone_Joints Mortar Failed 2018-2

33-178 Stone_Crack Single unit 2018-1



33-178 Stone_Crack Single unit 2018-2

33-186 Glass_Unsecured Loose 2018-1

33-186 Glass_Unsecured Loose 2018-2

33-204 TerraCotta_Spall Missing 2018-1

33-217 TerraCotta_Note Photo-flashing 2018-1

33-217 TerraCotta_Note Photo-flashing 2018-2

33-217 TerraCotta_Note Photo-flashing 2018-3

33-225 TerraCotta_Crack Single unit 2018-1

33-236 TerraCotta_Crack Single unit 2018-1

33-238 TerraCotta_SurfLoss Glaze loss 2018-1

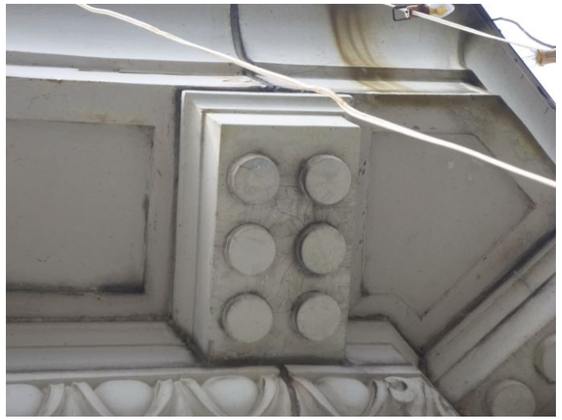
33-245 TerraCotta_Displacement Horizontal 2018-1

33-250 TerraCotta_Crack Crazing 2018-1

33-250 TerraCotta_Crack Crazing 2018-2

33-250 TerraCotta_Displacement Horizontal 2018-1

33-255 TerraCotta_Crack Crazing 2018-1



33-255 TerraCotta_Crack Crazing 2018-2

33-255 TerraCotta_Crack Crazing 2018-3

33-260 TerraCotta_SurfLoss Glaze loss 2018-1

33-264 TerraCotta_Crack Single unit 2018-1

33-264 TerraCotta_Crack Single unit 2018-2

33-275 TerraCotta_Displacement Horizontal 2018-1

33-275 TerraCotta_Displacement Horizontal 2018-2

34-89 Stone_Crack System joints 2018-1

34-152 Stone_Note Photo-stylolite 2018-1

34-195 TerraCotta_Spall Incipient 2018-1

34-202 TerraCotta_Note Photo-weeps 2018-1

34-204 TerraCotta_Spall Removed 2018-1

34-204 TerraCotta_Spall Removed 2018-2

34-222 TerraCotta_SoilStain Rust 2018-1

34-227 TerraCotta_Repair Patch Failed 2018-1

34-231 TerraCotta_Coating Coating Failed 2018-1

34-234 TerraCotta_Crack Single unit 2018-1

34-237 TerraCotta_Crack Crazing 2018-1

34-238 TerraCotta_SurfLoss Glaze loss 2018-1

34-240 TerraCotta_SoilStain Rust 2018-1

34-242 TerraCotta_SurfLoss Chipped 2018-1

34-243 TerraCotta_Crack Single unit 2018-1

34-244 TerraCotta_Displacement Horizontal 2018-1

34-253 TerraCotta_Spall Removed 2018-1

34-253 TerraCotta_Spall Removed 2018-2

34-258 TerraCotta_Crack Single unit 2018-1

34-260 TerraCotta_Crack Single unit 2018-1

34-261 TerraCotta_Crack Single unit 2018-1

34-267 TerraCotta_Crack Single unit 2018-1

34-267 TerraCotta_Crack Single unit 2018-2

34-268 TerraCotta_SurfLoss Glaze loss 2018-1

34-271 TerraCotta_Crack Single unit 2018-1

34-279 TerraCotta_SurfLoss Glaze loss 2018-1

34-279 TerraCotta_SurfLoss Glaze loss 2018-2

35-23 Stone_Repair Dutchman Failed 2018-1

35-61 Stone_Embedment Ferrous Embedment 2018-1

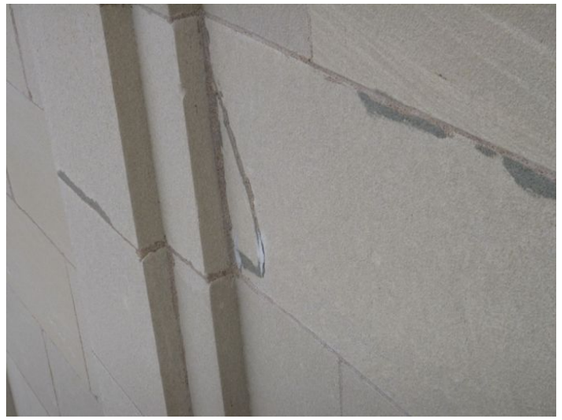
35-62 Stone_Crack Repair failed 2018-1

35-65 Stone_Spall Removed 2018-1

35-65 Stone_Spall Removed 2018-2

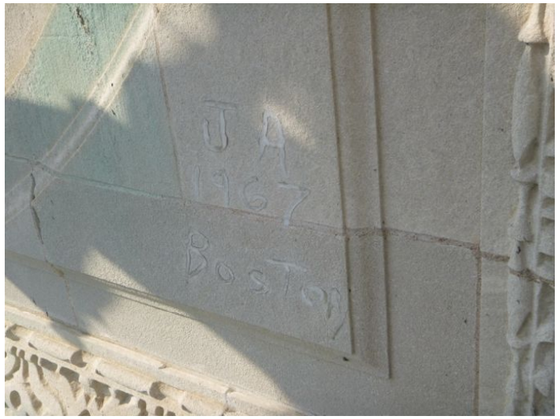
35-94 Stone_Crack Repair failed 2018-1

35-94 Stone_Crack Repair failed 2018-2



35-123 Stone_Spall Bonded 2018-1

35-159 Stone_SurfLoss Chipped 2018-1



35-176 Stone_Note Photo-graffiti 2018-1

35-207 TerraCotta_Note Photo-holes 2018-1

35-220 TerraCotta_Note Photo-weeps 2018-1

35-234 TerraCotta_Crack Single unit 2018-1

35-235 SheetMetal_Seam Solder Failed 2018-1

35-244 ArchMetal_Corrosion Surface 2018-1

35-245 TerraCotta_Crack Single unit 2018-1

35-247 ArchMetal_Corrosion Surface 2018-1

35-247 ArchMetal_Corrosion Surface 2018-2

35-250 TerraCotta_Crack Single unit 2018-1

35-255 TerraCotta_Crack Crazing 2018-1

35-255 TerraCotta_SurfLoss Glaze loss 2018-1

35-261 TerraCotta_Spall Bonded 2018-1

35-261 TerraCotta_Spall Bonded 2018-2

35-281 TerraCotta_Displacement Horizontal 2018-1

35-281 TerraCotta_Displacement Horizontal 2018-2

35-281 TerraCotta_Displacement Horizontal 2018-3

35-281 TerraCotta_Displacement Horizontal 2018-4

36-70 Stone_Crack System units and joints 2018-1

36-135 Stone_Crack System units and joints 2018-1

36-135 Stone_Crack System units and joints 2018-2

36-180 Glass_Crack Cracked pane 2018-1

36-189 Stone_Displacement Horizontal 2018-1

36-222 SheetMetal_Seam Solder Failed 2018-1

36-226 TerraCotta_Crack Single unit 2018-1

36-230 TerraCotta_Note Photo-flashing 2018-1

36-230 TerraCotta_Note Photo-flashing 2018-2

36-232 TerraCotta_Note Photo-general 2018-1

36-232 TerraCotta_Note Photo-general 2018-2

36-235 SheetMetal_Damaged Punctured 2018-1

36-237 TerraCotta_Joints Mortar Failed 2018-1

36-243 ArchMetal_Note Photo-bells 2018-1

36-243 ArchMetal_Note Photo-bells 2018-2

36-243 ArchMetal_Note Photo-bells 2018-3

36-243 ArchMetal_Note Photo-bells 2018-4

36-243 ArchMetal_Note Photo-bells 2018-5

36-243 ArchMetal_Note Photo-bells 2018-6

36-245 TerraCotta_Crack Single unit 2018-1

36-247 TerraCotta_Spall Missing 2018-1

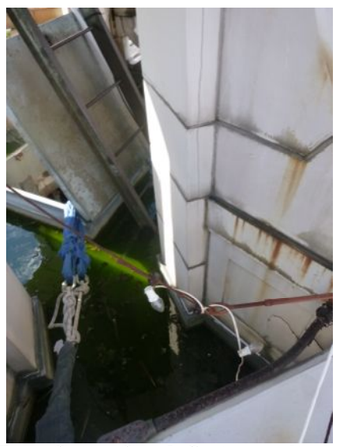
36-257 TerraCotta_Unsecured Hollow 2018-1

36-258 TerraCotta_Crack Single unit 2018-1

36-258 TerraCotta_Crack Single unit 2018-2

36-260 TerraCotta_Crack Crazing 2018-1

36-264 TerraCotta_Crack System units and joints 2018-1



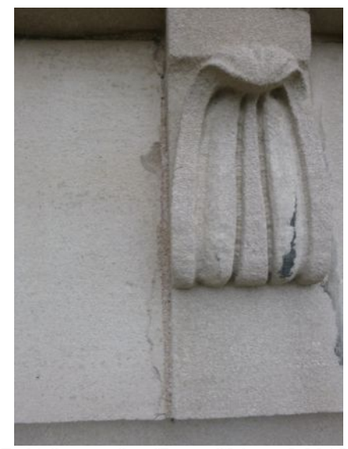
36-264 TerraCotta_Crack System units and joints 2018-2

36-267 TerraCotta_SoilStain Rust 2018-1

36-267 TerraCotta_SoilStain Rust 2018-2

37-26 Stone_SoilStain Copper 2018-1

37-26 Stone_SoilStain Copper 2018-2



37-64 Stone_SurfLoss Chipped 2018-1

37-163 Stone_Crack System units 2018-1

37-171 Stone_SurfLoss Eroded 2018-1

37-199 TerraCotta_Note Photo-general 2018-1

37-199 TerraCotta_Note Photo-general 2018-2

37-199 TerraCotta_Note Photo-general 2018-3

37-199 TerraCotta_Note Photo-general 2018-4

37-199 TerraCotta_Note Photo-general 2018-5

37-199 TerraCotta_Note Photo-general 2018-6

37-203 TerraCotta_Spall Incipient 2018-1

37-208 TerraCotta_Crack Single unit 2018-1

37-208 TerraCotta_Crack Single unit 2018-2

37-208 TerraCotta_Crack Single unit 2018-3

37-227 TerraCotta_Crack Crazing 2018-1

37-235 TerraCotta_Crack Single unit 2018-1

37-241 TerraCotta_SurfLoss Glaze loss 2018-1

37-247 TerraCotta_Joints Mortar Caulked Failed 2018-1

37-247 TerraCotta_Joints Mortar Caulked Failed 2018-2

37-247 TerraCotta_Joints Mortar Caulked Failed 2018-3

37-247 TerraCotta_Joints Mortar Caulked Failed 2018-4

37-249 TerraCotta_SurfLoss Glaze loss 2018-1

37-252 TerraCotta_SurfLoss Glaze loss 2018-1

37-255 TerraCotta_SoilStain Biological 2018-1

37-255 TerraCotta_SoilStain Biological 2018-2

37-255 TerraCotta_SoilStain Biological 2018-3

37-255 TerraCotta_SoilStain Biological 2018-4

37-255 TerraCotta_SoilStain Biological 2018-5

37-255 TerraCotta_SoilStain Biological 2018-6

38-22 Stone_Embedment Ferrous Embedment 2018-1

38-23 Stone_Embedment Ferrous Embedment 2018-1

38-27 Stone_Crack System units and joints 2018-1

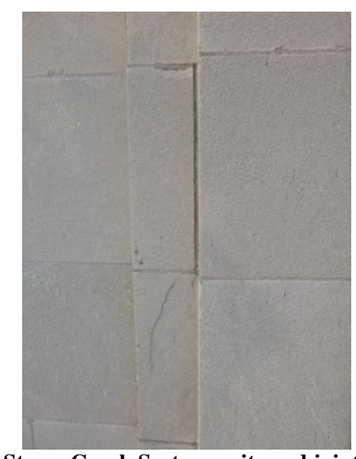
38-27 Stone_Crack System units and joints 2018-2

38-27 Stone_Crack System units and joints 2018-3

38-43 Stone_Crack System units and joints 2018-1

38-71 Stone_SurfLoss Chipped 2018-1

38-138 Stone_Spall Bonded 2018-1



38-164 Stone_Crack System units and joints 2018-1

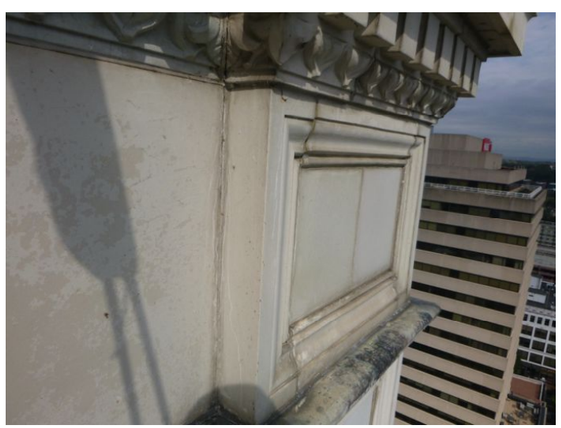
38-190 Stone_Spall Incipient 2018-1

38-203 TerraCotta_SurfLoss Chipped 2018-1

38-205 TerraCotta_Crack Single unit 2018-1

38-215 TerraCotta_Crack Single unit 2018-1

38-217 SheetMetal_Seam Solder Failed 2018-1



38-219 TerraCotta_SoilStain Leached Salts 2018-1

38-225 TerraCotta_SoilStain Rust 2018-1

38-237 SheetMetal_Seam Solder Failed 2018-1

38-239 TerraCotta_Crack Single unit 2018-1

38-240 TerraCotta_SurfLoss Chipped 2018-1

38-253 TerraCotta_Crack Single unit 2018-1

38-255 TerraCotta_Crack Crazing 2018-1

38-255 TerraCotta_Crack Crazing 2018-2

38-258 TerraCotta_Crack Crazing 2018-1

38-258 TerraCotta_Crack Crazing 2018-2

38-258 TerraCotta_Crack Crazing 2018-3

38-258 TerraCotta_Crack Crazing 2018-4

39-25 Stone_Crack System joints 2018-1

39-25 Stone_Crack System joints 2018-2

39-25 Stone_Crack System joints 2018-3

39-63 Stone_Spall Bonded 2018-1

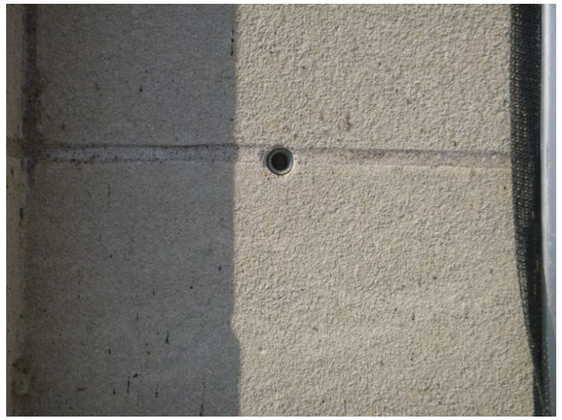
39-68 Stone_Joints Mortar Failed 2018-1

39-68 Stone_Joints Mortar Failed 2018-2

39-125 Stone_SurfLoss Chipped 2018-1

39-152 Stone_Crack System units and joints 2018-1

39-163 Stone_Displacement Horizontal 2018-1



39-177 Stone_Embedment Ferrous Embedment 2018-1

39-186 Stone_Spall Bonded 2018-1

39-220 TerraCotta_SurfLoss Chipped 2018-1

39-222 TerraCotta_SoilStain Leached Salts 2018-1

39-223 TerraCotta_Spall Removed 2018-1

39-227 TerraCotta_SoilStain Leached Salts 2018-1

39-234 TerraCotta_Crack Single unit 2018-1

39-250 TerraCotta_Crack Crazing 2018-1

39-256 TerraCotta_Displacement Horizontal 2018-1

39-256 TerraCotta_Displacement Horizontal 2018-2

39-256 TerraCotta_Displacement Horizontal 2018-3

39-262 TerraCotta_Crack Crazing 2018-1

39-262 TerraCotta_Crack Crazing 2018-2

40-46 Stone_Spall Removed 2018-1

40-46 Stone_Spall Removed 2018-2

40-181 Stone_Spall Bonded 2018-1

40-189 Stone_Crack Repair failed 2018-1

40-189 Stone_Crack Repair failed 2018-2

40-193 TerraCotta_Repair Patch Failed 2018-1

40-195 TerraCotta_Crack Repair failed 2018-1

40-202 SheetMetal_Seam Solder Failed 2018-1

40-203 TerraCotta_Spall Removed 2018-1

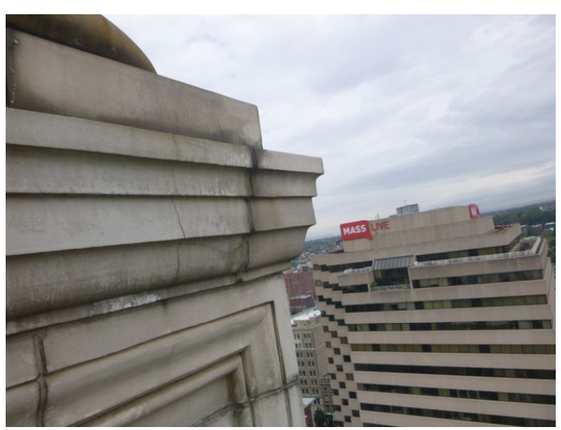
40-203 TerraCotta_Spall Removed 2018-2

40-203 TerraCotta_Spall Removed 2018-3

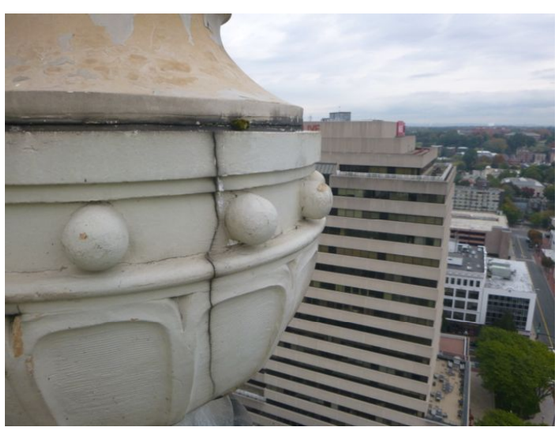
40-206 TerraCotta_SurfLoss Glaze loss 2018-1

40-215 TerraCotta_SurfLoss Glaze loss 2018-1

40-223 TerraCotta_Spall Incipient 2018-1



40-225 TerraCotta_Spall Incipient 2018-1



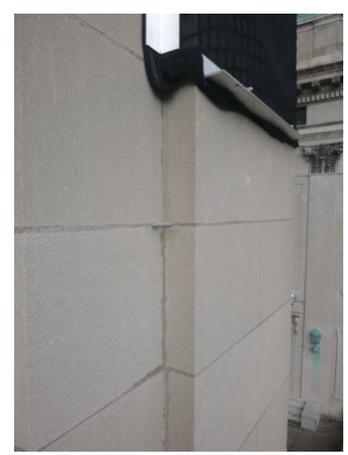
40-229 TerraCotta_Crack Single unit 2018-1

40-229 TerraCotta_Crack Single unit 2018-2

40-230 TerraCotta_SurfLoss Glaze loss 2018-1

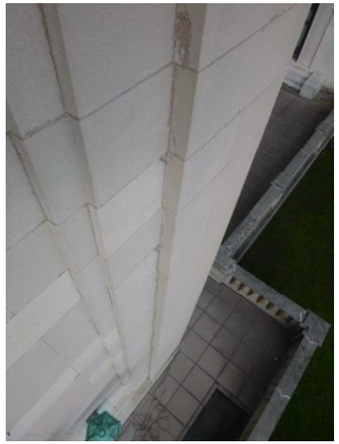
40-230 TerraCotta_SurfLoss Glaze loss 2018-2

40-230 TerraCotta_SurfLoss Glaze loss 2018-3



41-42 Stone_Crack System units and joints 2018-1

41-42 Stone_Crack System units and joints 2018-2



41-42 Stone_Crack System units and joints 2018-3

41-191 Stone_Crack Repair failed 2018-1

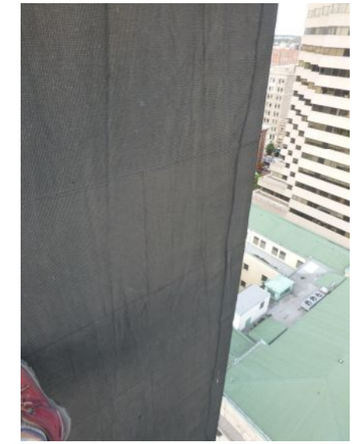
41-199 TerraCotta_SurfLoss Chipped 2018-1

41-199 TerraCotta_SurfLoss Chipped 2018-2

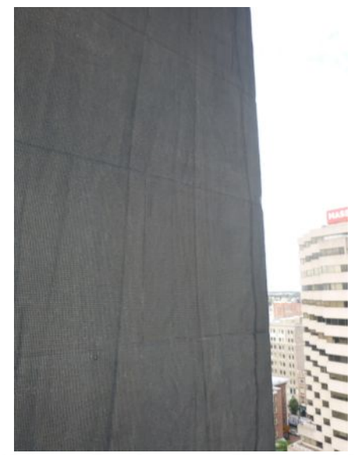
41-223 TerraCotta_Crack Crazing 2018-1

41-225 TerraCotta_SoilStain Biological 2018-1

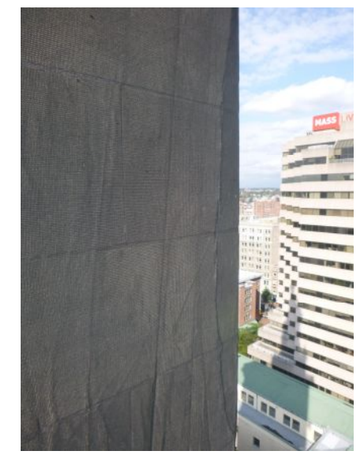
42-102 Stone_Note Photo-hole in net 2018-1



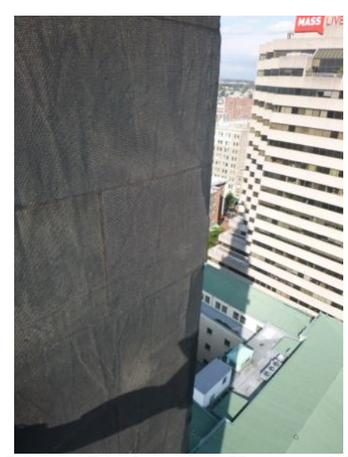
42-165 Stone_Displacement Horizontal 2018-1



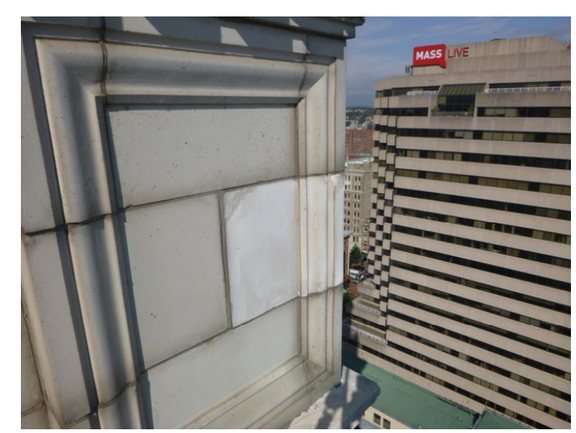
42-165 Stone_Displacement Horizontal 2018-2



42-172 Stone_Crack Repair failed 2018-1



42-185 Stone_Displacement Horizontal 2018-1



42-195 TerraCotta_Coating Coating Failed 2018-1

42-195 TerraCotta_Spall Bonded 2018-1

42-198 TerraCotta_Note Photo-flashing 2018-1

42-203 TerraCotta_Spall Removed 2018-1

42-207 ArchMetal_Damaged Bent 2018-1

42-223 TerraCotta_Joints Mortar Caulked Failed 2018-1

42-223 TerraCotta_Joints Mortar Caulked Failed 2018-2

42-223 TerraCotta_Joints Mortar Caulked Failed 2018-3

42-229 TerraCotta_SurfLoss Glaze loss 2018-1

42-234 TerraCotta_Joints Mortar Caulked Failed 2018-1

42-234 TerraCotta_Joints Mortar Caulked Failed 2018-2

42-234 TerraCotta_Joints Mortar Caulked Failed 2018-3

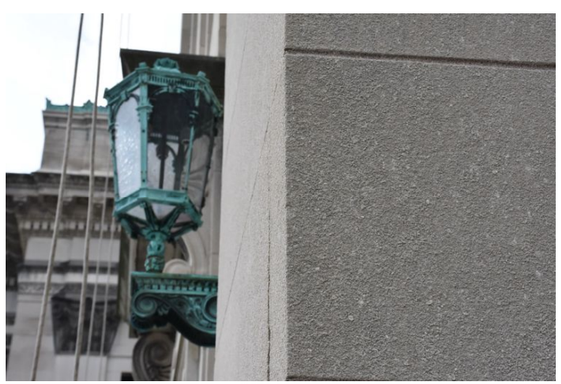
43-23 Stone_Displacement Horizontal 2018-1

43-23 Stone_Displacement Horizontal 2018-2

43-23 Stone_Displacement Horizontal 2018-3

43-23 Stone_Displacement Horizontal 2018-4

43-23 Stone_Displacement Horizontal 2018-5



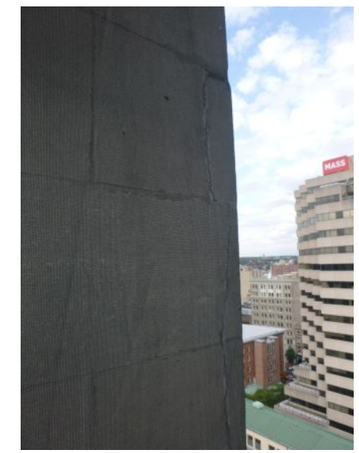
43-23 Stone_Displacement Horizontal 2018-6

43-24 Stone_Crack System units and joints 2018-1

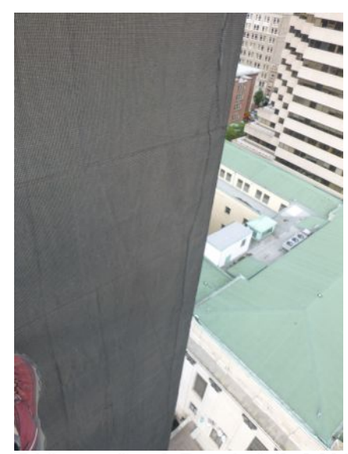
43-24 Stone_Crack System units and joints 2018-2

43-24 Stone_Crack System units and joints 2018-3

43-24 Stone_Crack System units and joints 2018-4



43-156 Stone_Crack Repair failed 2018-1



43-156 Stone_Crack Repair failed 2018-2

43-192 Stone_Displacement Horizontal 2018-1

43-218 TerraCotta_Joints Mortar Caulked Failed 2018-1

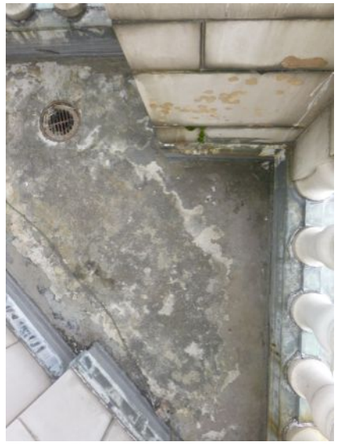
43-218 TerraCotta_Joints Mortar Caulked Failed 2018-2

43-218 TerraCotta_Joints Mortar Caulked Failed 2018-3

43-225 TerraCotta_SurfLoss Glaze loss 2018-1

43-227 TerraCotta_Note Photo-inboard 2018-1

43-227 TerraCotta_Note Photo-inboard 2018-2

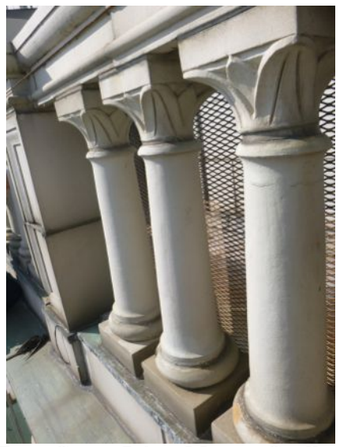


43-227 TerraCotta_Note Photo-inboard 2018-3

44-204 SheetMetal_Damaged Torn 2018-1

46-200 TerraCotta_Joints Mortar Caulked Failed 2018-1

46-200 TerraCotta_Joints Mortar Caulked Failed 2018-2



46-200 TerraCotta_Joints Mortar Caulked Failed 2018-3

46-240 TerraCotta_Note Photo-lead copper flashing 2018-1

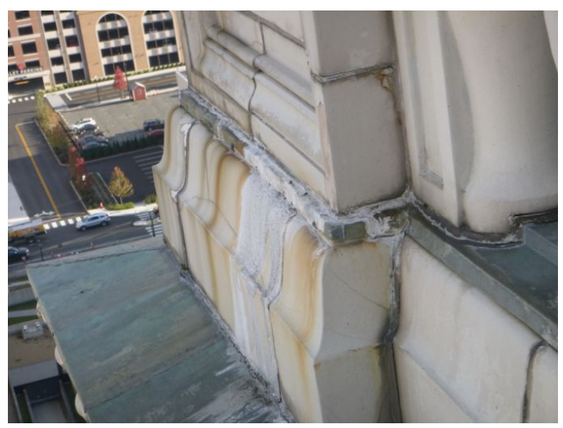
96-206 TerraCotta_Displacement Horizontal and Vertical 2018-1

97-21 Stone_Crack System units and joints 2018-1

98-203 SheetMetal_Damaged Torn 2018-1

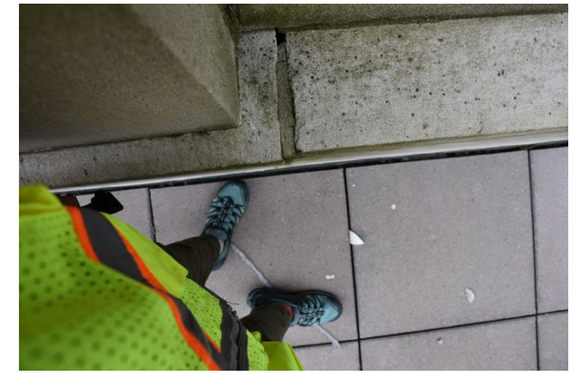
98-207 ArchMetal_Damaged Bent 2018-1

98-222 TerraCotta_SurfLoss Glaze loss 2018-1



98-223 TerraCotta_SoilStain Leached Salts 2018-1

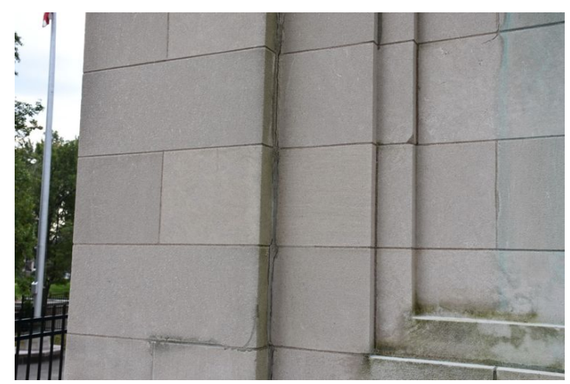
99-21 Stone_Displacement Horizontal 2018-1



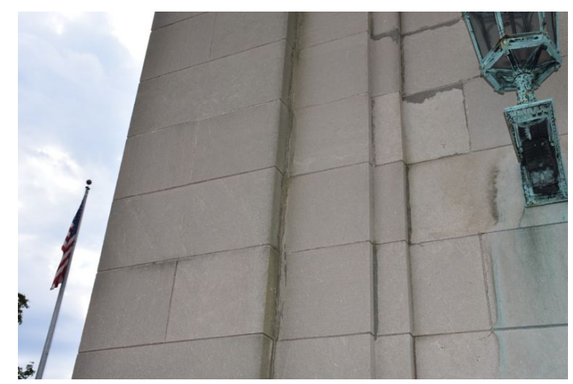
99-21 Stone_Displacement Horizontal 2018-2

99-24 Stone_Crack System units and joints 2018-1

99-24 Stone_Crack System units and joints 2018-2



99-24 Stone_Crack System units and joints 2018-3



99-24 Stone_Crack System units and joints 2018-4

99-41 Stone_Spall Incipient 2018-1

99-121 Stone_Note Photo-holes in net 2018-1

99-121 Stone_Note Photo-holes in net 2018-2

99-191 Stone_Displacement Horizontal 2018-1

99-206 TerraCotta_Crack Single unit 2018-1

100-21 Stone_Crack System joints 2018-1

100-24 Stone_Spall Incipient 2018-1

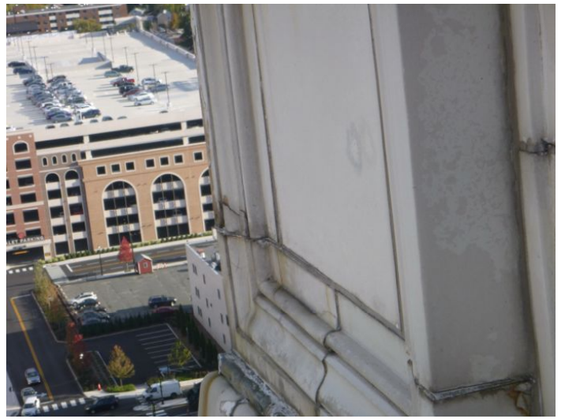
100-173 Stone_Crack System units and joints 2018-1

100-199 TerraCotta_Note Photo-general 2018-1

100-199 TerraCotta_Note Photo-general 2018-2

100-199 TerraCotta_Note Photo-general 2018-3

100-199 TerraCotta_Note Photo-general 2018-4



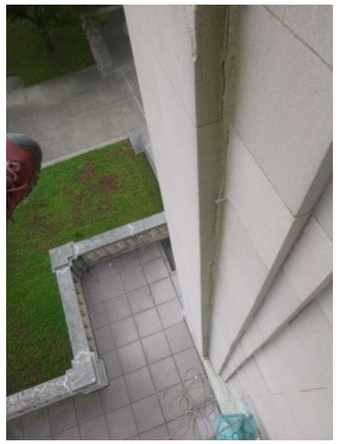
100-224 TerraCotta_Spall Bonded 2018-1

100-230 TerraCotta_SurfLoss Glaze loss 2018-1

100-230 TerraCotta_SurfLoss Glaze loss 2018-2

101-38 Stone_Crack System units and joints 2018-1

101-38 Stone_Crack System units and joints 2018-2



101-38 Stone_Crack System units and joints 2018-3

101-85 Stone_Spall Incipient 2018-1

101-127 Stone_Spall Incipient 2018-1

101-127 Stone_Spall Missing 2018-1

101-128 Stone_Spall Incipient 2018-1

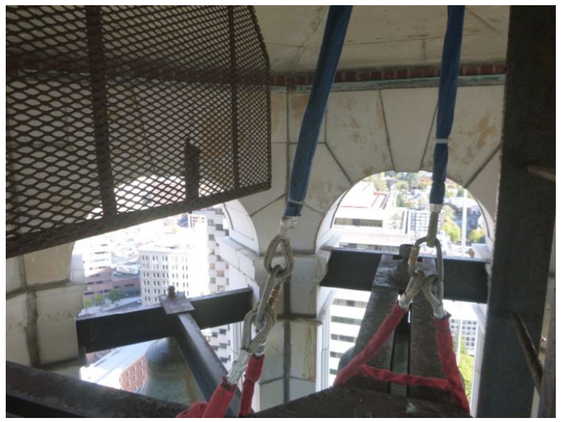
101-132 Stone_Spall Bonded 2018-1

101-150 Stone_Spall Incipient 2018-1

101-221 TerraCotta_SoilStain Biological 2018-1

101-252 TerraCotta_Note Photo-inboard arches 2018-1

101-252 TerraCotta_Note Photo-inboard arches 2018-2



101-252 TerraCotta_Note Photo-inboard arches 2018-3

101-252 TerraCotta_Note Photo-inboard arches 2018-4

101-252 TerraCotta_Note Photo-inboard arches 2018-5

101-252 TerraCotta_Note Photo-inboard arches 2018-6

101-252 TerraCotta_Note Photo-inboard arches 2018-7

101-252 TerraCotta_Note Photo-inboard arches 2018-8

101-252 TerraCotta_Note Photo-inboard arches 2018-9

101-255 TerraCotta_Note Photo-interior 2018-1

101-255 TerraCotta_Note Photo-interior 2018-2

101-255 TerraCotta_Note Photo-interior 2018-3

101-255 TerraCotta_Note Photo-interior 2018-4

101-255 TerraCotta_Note Photo-interior 2018-5

101-255 TerraCotta_Note Photo-interior 2018-6

101-255 TerraCotta_Note Photo-interior 2018-7

101-255 TerraCotta_Note Photo-interior 2018-8

101-255 TerraCotta_Note Photo-interior 2018-9

101-255 TerraCotta_Note Photo-interior 2018-10

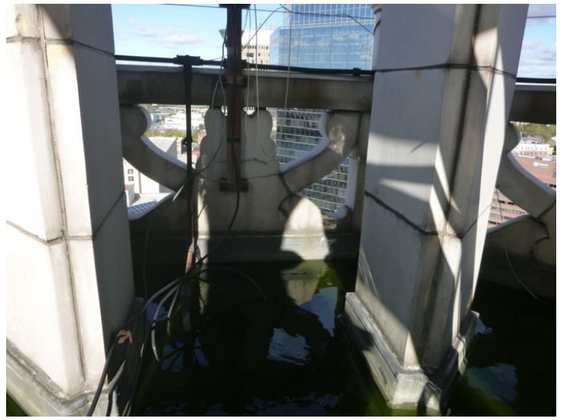
101-260 TerraCotta_Note Photo-inboard parapet 2018-1

101-260 TerraCotta_Note Photo-inboard parapet 2018-2

101-260 TerraCotta_Note Photo-inboard parapet 2018-3

101-260 TerraCotta_Note Photo-inboard parapet 2018-4

101-260 TerraCotta_Note Photo-inboard parapet 2018-5

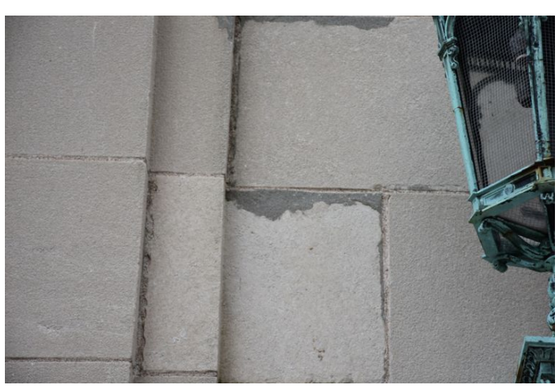


101-260 TerraCotta_Note Photo-inboard parapet 2018-6

101-260 TerraCotta_Note Photo-inboard parapet 2018-7

101-260 TerraCotta_Note Photo-inboard parapet 2018-8

101-260 TerraCotta_Note Photo-inboard parapet 2018-9



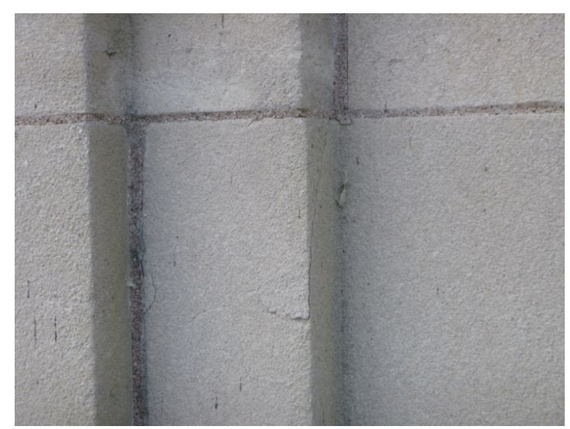
102-31 Stone_Repair Patch Failed 2018-1

102-33 Stone_Repair Patch Failed 2018-1

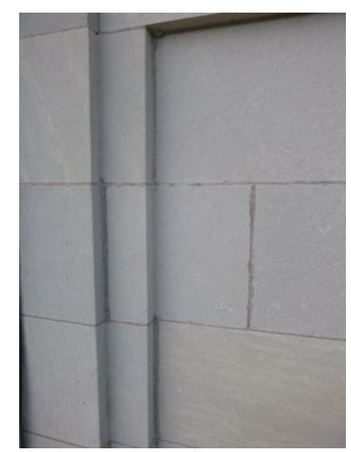
102-127 Stone_Spall Incipient 2018-1

102-151 Stone_Crack System joints 2018-1

102-159 Stone_SurfLoss Chipped 2018-1



102-161 Stone_Spall Incipient 2018-1



102-166 Stone_Crack System joints 2018-1

102-230 TerraCotta_SoilStain Leached Salts 2018-1

103-22 Stone_SurfLoss Chipped 2018-1

103-24 Stone_SoilStain Copper 2018-1

103-24 Stone_SoilStain Copper 2018-2

103-26 Stone_Crack System units and joints 2018-1

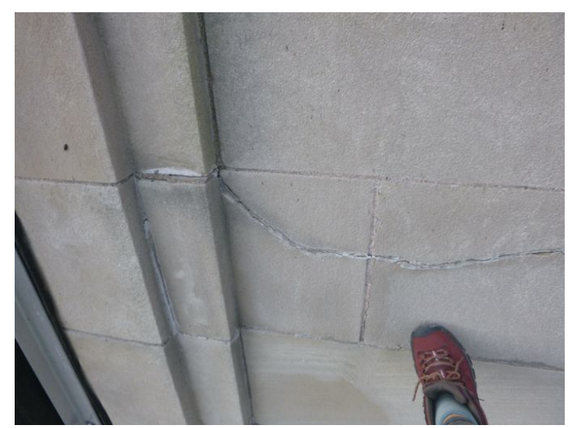
103-45 Stone_SurfLoss Chipped 2018-1

103-127 Stone_Crack System units and joints 2018-1

103-127 Stone_Crack System units and joints 2018-2

103-127 Stone_Crack System units and joints 2018-4

103-127Stone_Crack System units and joints 2018-3



103-129 Stone_Crack System units and joints 2018-1

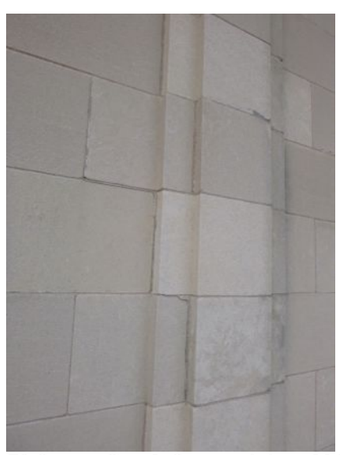
103-129 Stone_Crack System units and joints 2018-2

103-129 Stone_Crack System units and joints 2018-3

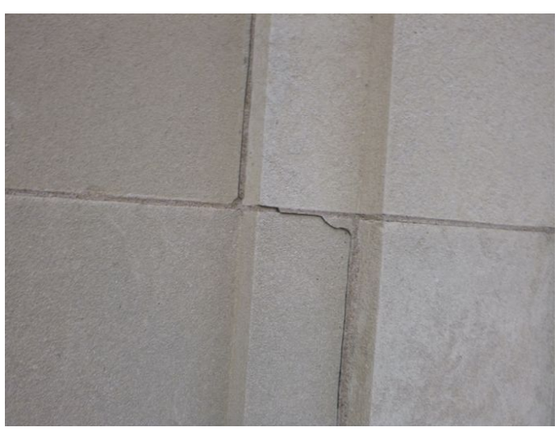
103-129 Stone_Crack System units and joints 2018-4

103-189 Stone_Crack System units and joints 2018-1

104-30 Stone_Crack System units and joints 2018-1



104-79 Stone_Crack System joints 2018-1



104-79 Stone_Crack System joints 2018-2

104-157 Stone_SurfLoss Chipped 2018-1

104-205 TerraCotta_SurfLoss Glaze loss 2018-1

105-23 Stone_Repair Dutchman Failed 2018-1

105-93 Stone_Repair Patch Failed 2018-1

105-131 Stone_Spall Incipient 2018-1

105-132 Stone_Spall Incipient 2018-1

105-142 Stone_Note Photo-general 2018-1

105-142 Stone_Note Photo-general 2018-2

105-142 Stone_Note Photo-general 2018-3

105-142 Stone_Note Photo-general 2018-4

105-142 Stone_Note Photo-general 2018-5

105-142 Stone_Note Photo-general 2018-6

105-142 Stone_Note Photo-general 2018-7

105-142 Stone_Note Photo-general 2018-8

105-204 TerraCotta_Spall Missing 2018-1

105-223 TerraCotta_SurfLoss Glaze loss 2018-1

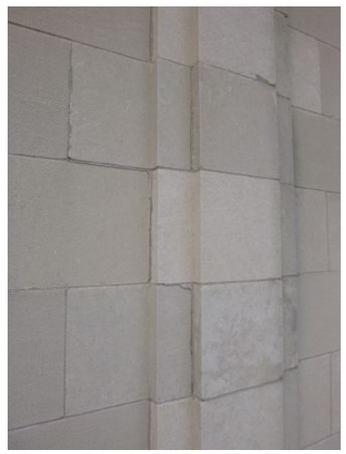
105-227 TerraCotta_Note Photo-cracks at balustrade 2018-1

105-227 TerraCotta_Note Photo-cracks at balustrade 2018-2

105-227 TerraCotta_Note Photo-cracks at balustrade 2018-3

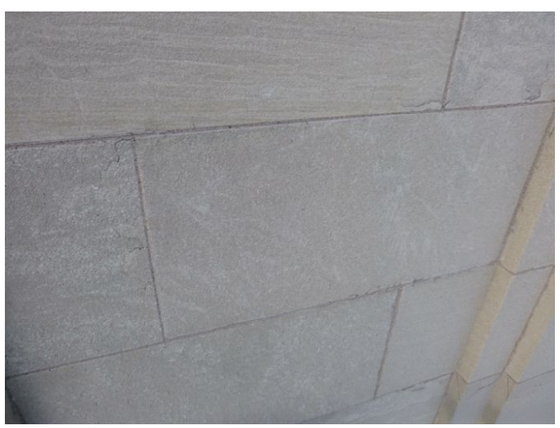
106-22 Stone_SoilStain Black Crusts 2018-1

106-43 Stone_Spall Incipient 2018-1



106-80 Stone_Displacement Horizontal 2018-1

106-158 Stone_Spall Incipient 2018-1



106-162 Stone_Displacement Horizontal 2018-1

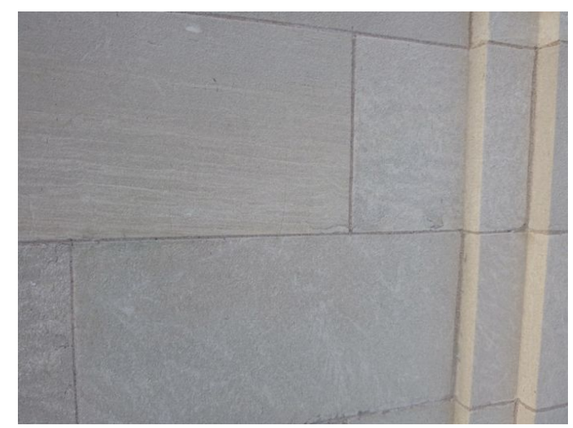
106-186 ArchMetal_Unsecured Loose 2018-1

106-222 TerraCotta_Crack Single unit 2018-1

107-128 Stone_Repair Patch Failed 2018-1

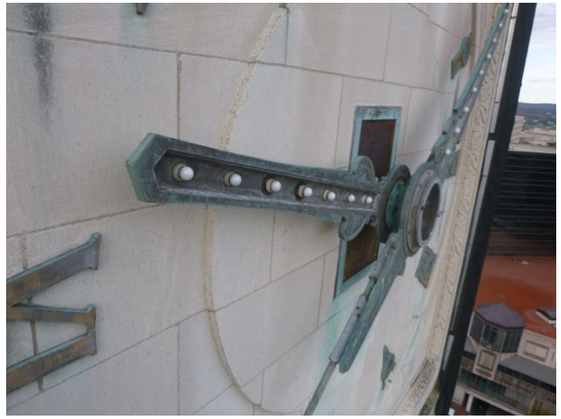
107-128 Stone_Spall Missing 2018-1

107-133 Stone_Spall Missing 2018-1



107-160 Stone_SurfLoss Chipped 2018-1

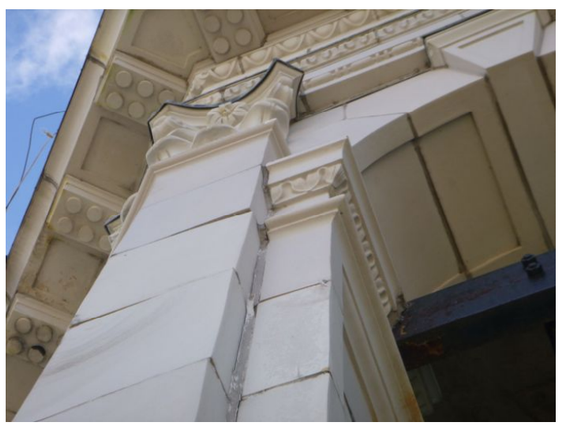
107-182 Stone_Note Photo-northeast clock general 2018-1



107-182 Stone_Note Photo-northeast clock general 2018-2

107-182 Stone_Note Photo-northeast clock general 2018-3

107-231 TerraCotta_Crack Single unit 2018-1



107-249 TerraCotta_Displacement Horizontal 2018-1

107-256 TerraCotta_Crack Single unit 2018-1

107-263 TerraCotta_Crack System units 2018-1

108-34 Stone_Joints Mortar Caulked Failed 2018-1

108-131 Stone_Spall Incipient 2018-1

108-147 Stone_SurfLoss Chipped 2018-1

108-152 Stone_SurfLoss Chipped 2018-1

108-202 TerraCotta_Note Photo-weeps 2018-1

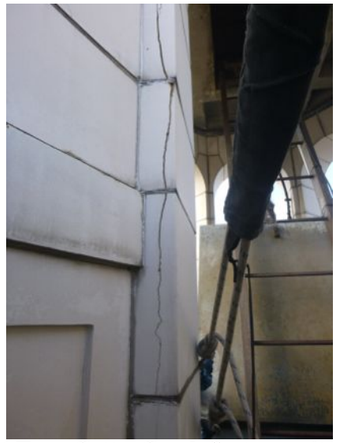
108-202 TerraCotta_Note Photo-weeps 2018-2

108-222 TerraCotta_Crack Single unit 2018-1

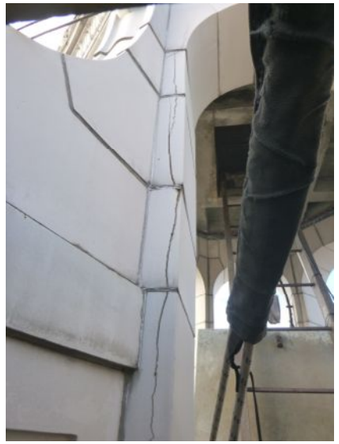
108-251 TerraCotta_SoilStain Biological 2018-1

108-256 TerraCotta_Crack Single unit 2018-1

108-256 TerraCotta_Crack Single unit 2018-2



108-264 TerraCotta_Crack System units 2018-1



108-264 TerraCotta_Crack System units 2018-2

108-278 TerraCotta_Displacement Horizontal 2018-1

109-37 Stone_SoilStain Atmospheric 2018-1

109-37 Stone_SoilStain Atmospheric 2018-2

109-44 Stone_SurfLoss Chipped 2018-1

109-52 Wood_Coating Coating Failed 2018-1

109-52 Wood_Coating Coating Failed 2018-2

109-128 Stone_Spall Missing 2018-1

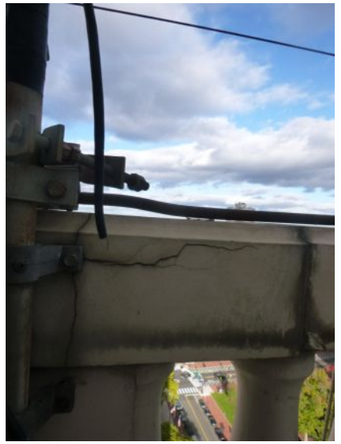
109-186 ArchMetal_Unsecured Loose 2018-1

109-225 TerraCotta_Crack Single unit 2018-1

109-226 TerraCotta_Spall Bonded 2018-1

109-226 TerraCotta_Spall Bonded 2018-2

109-226 TerraCotta_Spall Bonded 2018-3



109-226 TerraCotta_Spall Bonded 2018-4

109-248 TerraCotta_Crack Single unit 2018-1

109-260 TerraCotta_Joints Mortar Caulked Failed 2018-1

109-260 TerraCotta_Joints Mortar Caulked Failed 2018-2

109-260 TerraCotta_Joints Mortar Caulked Failed 2018-3

109-260 TerraCotta_Joints Mortar Caulked Failed 2018-4

109-260 TerraCotta_Joints Mortar Caulked Failed 2018-5

109-260 TerraCotta_Joints Mortar Caulked Failed 2018-6

109-271 TerraCotta_SurfLoss Glaze loss 2018-1

110-24 ArchMetal_Note Photo-general 2018-1

110-24 ArchMetal_Note Photo-general 2018-2

110-24 ArchMetal_Note Photo-general 2018-3

110-181 Glass_Crack Cracked pane 2018-1

110-204 TerraCotta_Note Photo-general 2018-1

110-204 TerraCotta_Note Photo-general 2018-2

110-222 SheetMetal_Seam Fastener Failed 2018-1

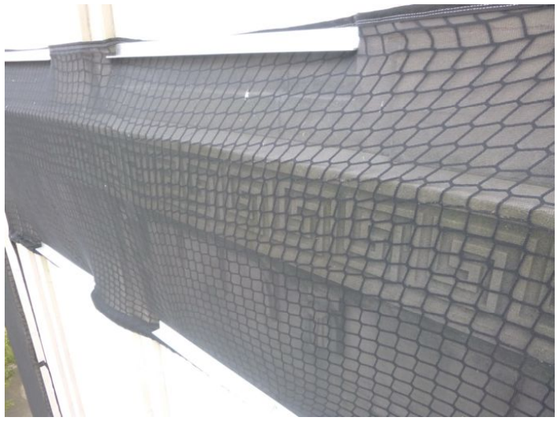
110-227 TerraCotta_Crack Single unit 2018-1

110-239 TerraCotta_Crack Crazing 2018-1

110-249 ArchMetal_Corrosion Surface 2018-1

110-252 TerraCotta_Note Photo-flashing 2018-1

110-269 TerraCotta_Crack Single unit 2018-1



111-69 Stone_Note Photo-general 2018-1

111-69 Stone_Note Photo-general 2018-2

111-69 Stone_Note Photo-general 2018-3

111-129 Stone_Spall Bonded 2018-1

111-132 Stone_Displacement Horizontal 2018-1

111-224 TerraCotta_Crack Single unit 2018-1

111-224 TerraCotta_Crack Single unit 2018-2

111-224 TerraCotta_Crack Single unit 2018-3

111-250 TerraCotta_Crack System units 2018-1

111-257 TerraCotta_Crack Single unit 2018-1

111-269 TerraCotta_SoilStain Rust 2018-1

111-275 TerraCotta_Displacement Horizontal 2018-1

112-43 Stone_Crack System units and joints 2018-1

112-67 Stone_Crack System units and joints 2018-1

112-67 Stone_Crack System units and joints 2018-2

112-67 Stone_Crack System units and joints 2018-3

112-67 Stone_Crack System units and joints 2018-4

112-82 Stone_Spall Incipient 2018-1

112-144 Stone_SurfLoss Chipped 2018-1

112-260 TerraCotta_Crack Single unit 2018-1

113-129 Stone_Spall Missing 2018-1

113-238 TerraCotta_Crack Single unit 2018-1

113-250 TerraCotta_Crack Single unit 2018-1

113-254 TerraCotta_Crack Single unit 2018-1

113-259 TerraCotta_Repair Patch Failed 2018-1

113-263 TerraCotta_Crack Single unit 2018-1

113-265 TerraCotta_Note Photo-general 2018-1

113-265 TerraCotta_Note Photo-general 2018-2

113-265 TerraCotta_Note Photo-general 2018-3

113-265 TerraCotta_Note Photo-general 2018-4

113-265 TerraCotta_Note Photo-general 2018-5

113-271 TerraCotta_Spall Bonded 2018-1

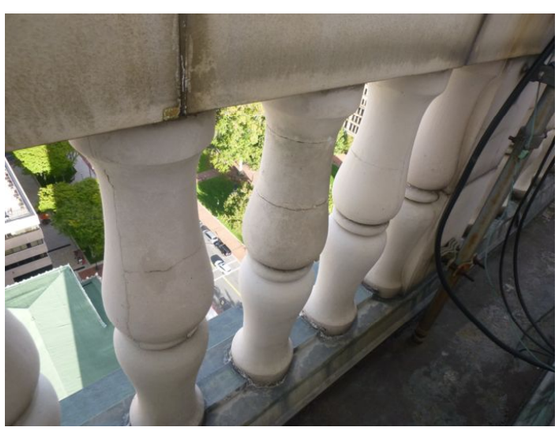
113-274 TerraCotta_Crack Single unit 2018-1

114-22 Stone_SoilStain Black Crusts 2018-1

114-130 Stone_Spall Missing 2018-1

114-173 Stone_Crack System joints 2018-1

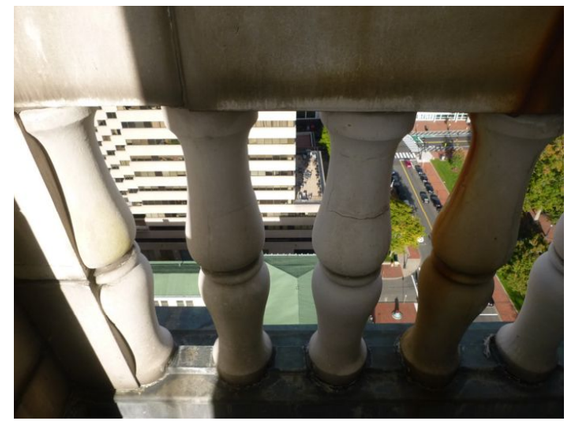
114-185 ArchMetal_Unsecured Loose 2018-1



114-227 TerraCotta_Note Photo-cracks at balustrade 2018-1

114-227 TerraCotta_Note Photo-cracks at balustrade 2018-2

114-227 TerraCotta_Note Photo-cracks at balustrade 2018-3



114-227 TerraCotta_Note Photo-cracks at balustrade 2018-4

114-256 TerraCotta_Repair Patch Failed 2018-1

115-84 Stone_Crack System joints 2018-1

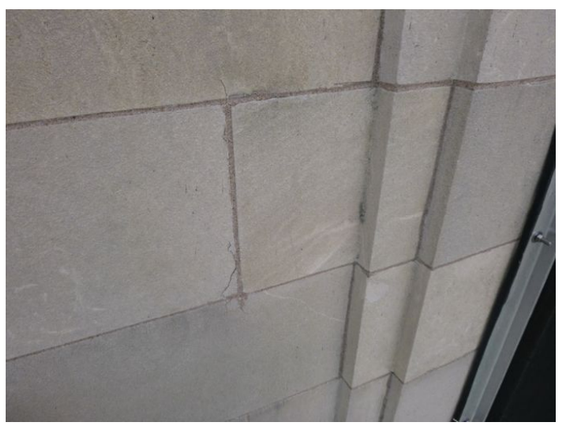
115-250 TerraCotta_Crack Single unit 2018-1

115-258 TerraCotta_Spall Bonded 2018-1

116-25 Stone_SoilStain Copper 2018-1

116-25 Stone_SoilStain Copper 2018-2

116-65 Stone_Spall Missing 2018-1

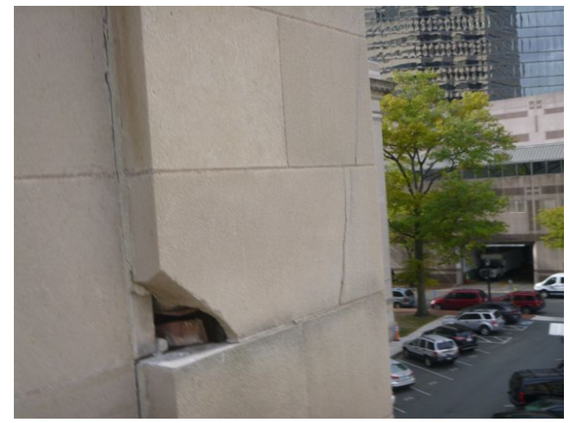


116-130 Stone_SurfLoss Chipped 2018-1

116-256 TerraCotta_Crack Single unit 2018-1

116-256 TerraCotta_Crack Single unit 2018-2

116-256 TerraCotta_Crack Single unit 2018-3



117-45 Stone_Crack System units and joints 2018-1

117-45 Stone_Crack System units and joints 2018-2

117-133 Stone_SurfLoss Chipped 2018-1

117-212 TerraCotta_Crack Single unit 2018-1

117-218 SheetMetal_Seam Solder Failed 2018-1

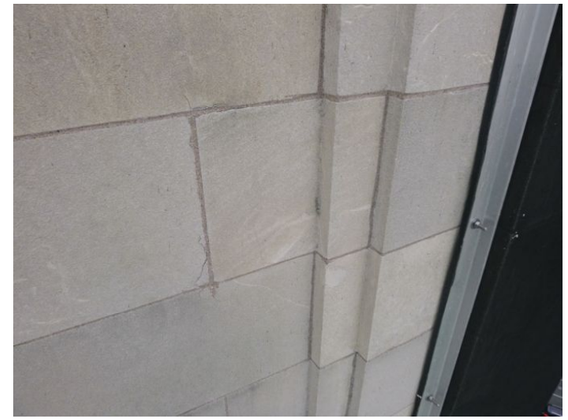
117-226 TerraCotta_SoilStain Rust 2018-1

117-254 TerraCotta_Crack Single unit 2018-1

117-263 TerraCotta_Crack Single unit 2018-1

118-118 Stone_SurfLoss Eroded 2018-1

118-126Stone_SurfLoss Chipped 2018-1



118-130 Stone_Displacement Horizontal 2018-1

118-185 Stone_Spall Incipient 2018-1

118-202 ArchMetal_Corrosion Perforated 2018-1

118-202 ArchMetal_Corrosion Perforated 2018-2

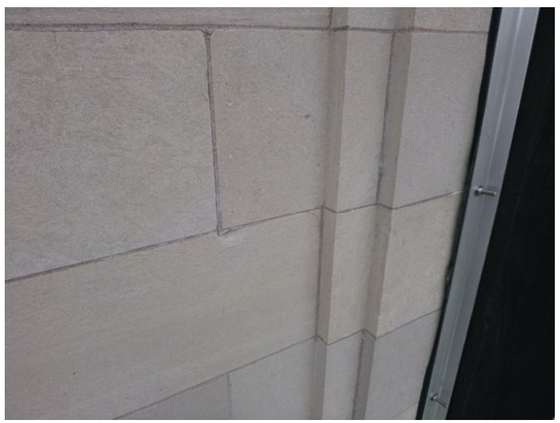
118-208 TerraCotta_SurfLoss Glaze loss 2018-1

118-222 TerraCotta_SurfLoss Glaze loss 2018-1

118-222 TerraCotta_SurfLoss Glaze loss 2018-2

118-226 TerraCotta_Spall Incipient 2018-1

119-23 Stone_Repair Patch Failed 2018-1



119-166 Stone_Crack System units and joints 2018-1

119-169 Stone_Spall Incipient 2018-1

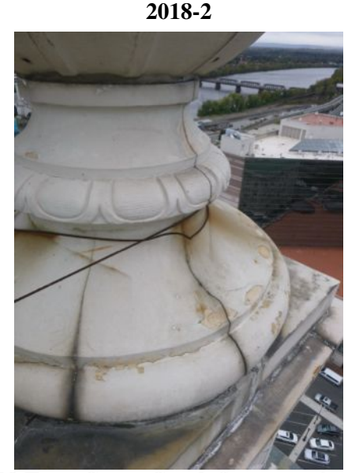
119-173 ArchMetal_Unsecured Loose 2018-1

119-221 TerraCotta_SoilStain Leached Salts 2018-1

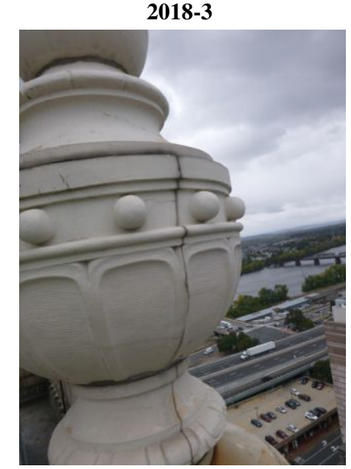
119-225 TerraCotta_Crack System units and joints 2018-1

119-225 TerraCotta_Crack System units and joints 2018-2

119-225 TerraCotta_Crack System units and joints 2018-3



119-228 TerraCotta_Crack System units 2018-1

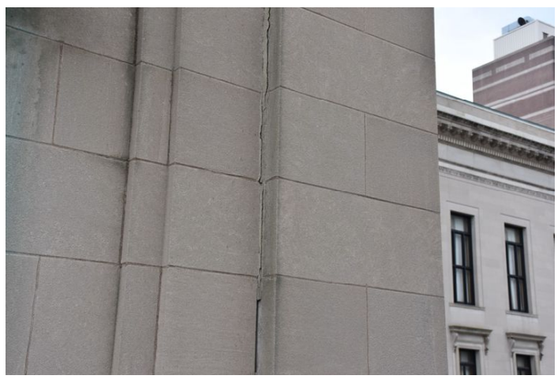


119-228 TerraCotta_Crack System units 2018-2

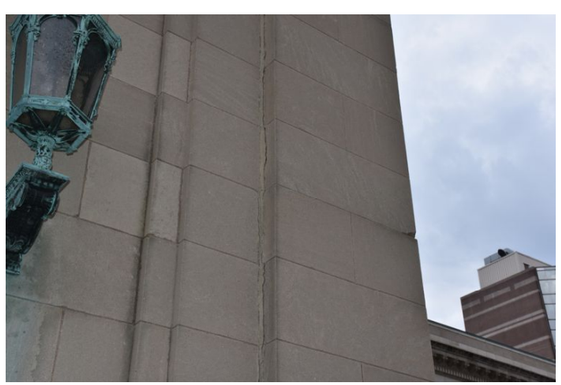
119-228 TerraCotta_Crack System units 2018-3

120-28 Stone_Crack System joints 2018-1

120-28 Stone_Crack System joints 2018-2



120-28 Stone_Crack System joints 2018-3



120-28 Stone_Crack System joints 2018-4

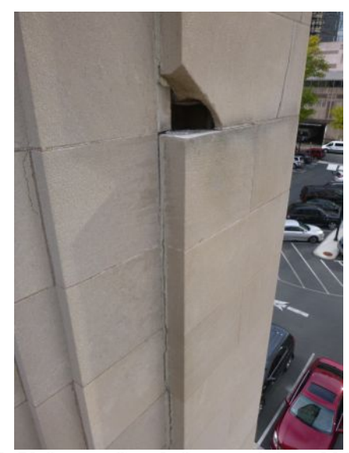
120-46 Stone_Unsecured Missing 2018-1

120-46 Stone_Unsecured Missing 2018-2

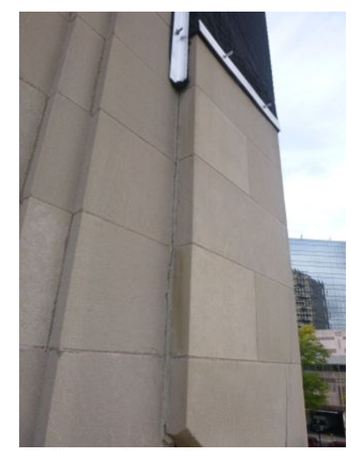
120-46 Stone_Unsecured Missing 2018-3

120-46 Stone_Unsecured Missing 2018-4

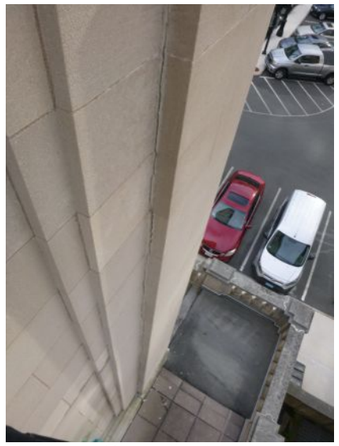
120-46 Stone_Unsecured Missing 2018-5



120-50 Stone_Crack System joints 2018-1



120-50 Stone_Crack System joints 2018-2



120-50 Stone_Crack System joints 2018-3

120-258 TerraCotta_Note Photo-weeps 2018-1

120-258 TerraCotta_Note Photo-weeps 2018-2

121-21 Stone_Displacement Horizontal 2018-1

121-21 Stone_Displacement Horizontal 2018-2

121-191 Stone_Displacement Horizontal 2018-1

122-21 Stone_Crack Repair failed 2018-1

123-32 Stone_Spall Missing 2018-1

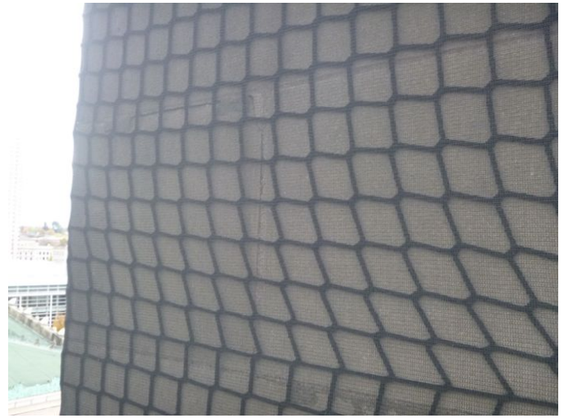
123-205 TerraCotta_Spall Bonded 2018-1

123-207 TerraCotta_SurfLoss Glaze loss 2018-1

173-204 TerraCotta_SurfLoss Glaze loss 2018-1

176-27 Stone_Crack Repair failed 2018-1

176-27 Stone_Crack Repair failed 2018-2



176-86 Stone_Crack System joints 2018-1

176-202 TerraCotta_SurfLoss Chipped 2018-1

177-125 Stone_Note Photo-probe 2018-1

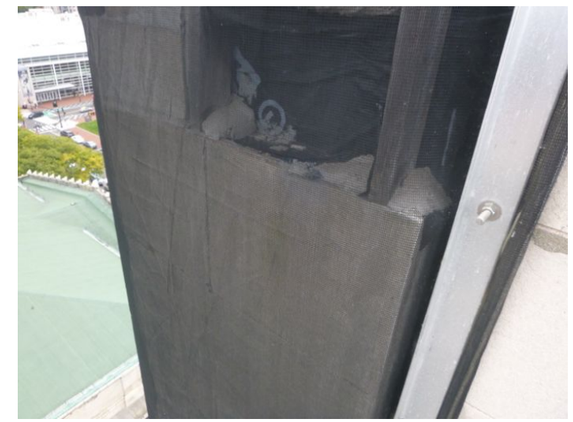
177-150 Stone_Crack Repair failed 2018-1

177-150 Stone_Crack Repair failed 2018-2

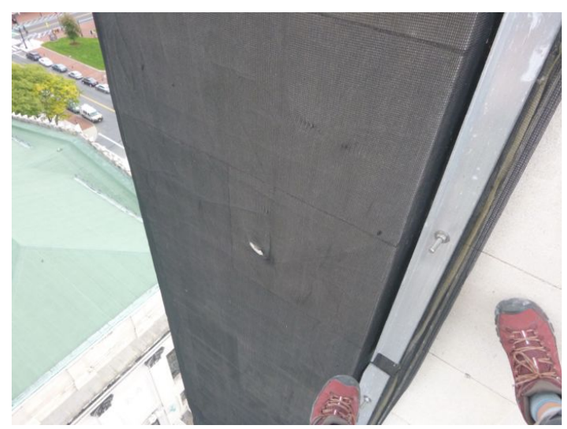
177-150 Stone_Crack Repair failed 2018-3

177-178 Stone_Crack System units and joints 2018-1

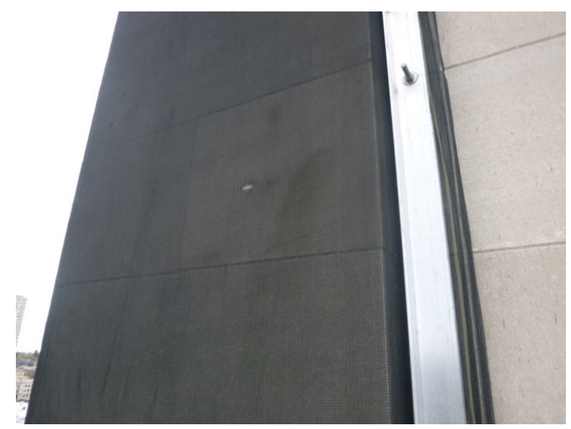
178-131 Stone_Crack System units and joints 2018-1



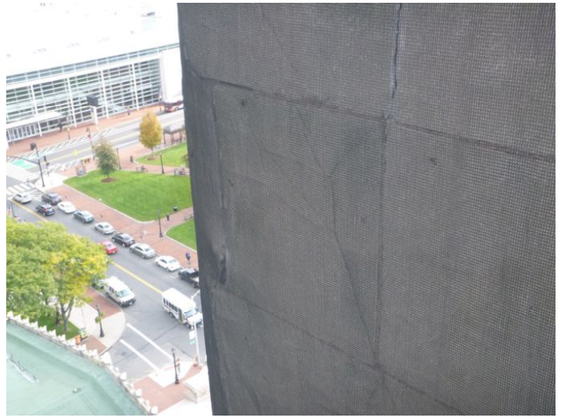
178-131 Stone_Crack System units and joints 2018-2



178-140 Stone_Note Photo-holes in net 2018-1



178-140 Stone_Note Photo-holes in net 2018-2



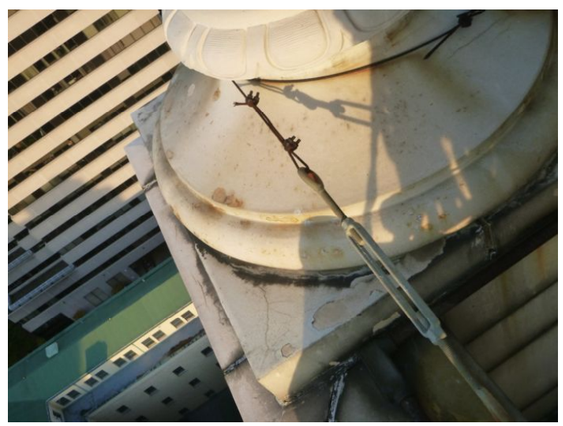
178-152 Stone_Displacement Horizontal 2018-1

178-164 Stone_Crack Repair failed 2018-1

178-190 Stone_Displacement Horizontal 2018-1

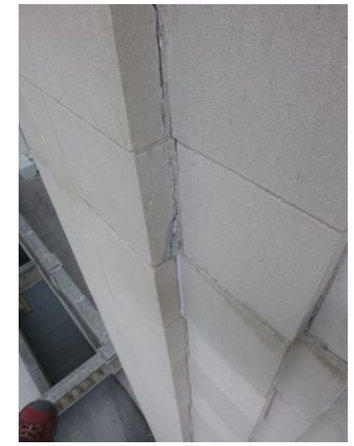
178-203 SheetMetal_Seam Solder Failed 2018-1

178-224 TerraCotta_Crack Crazing 2018-1



178-226 TerraCotta_SurfLoss Glaze loss 2018-1

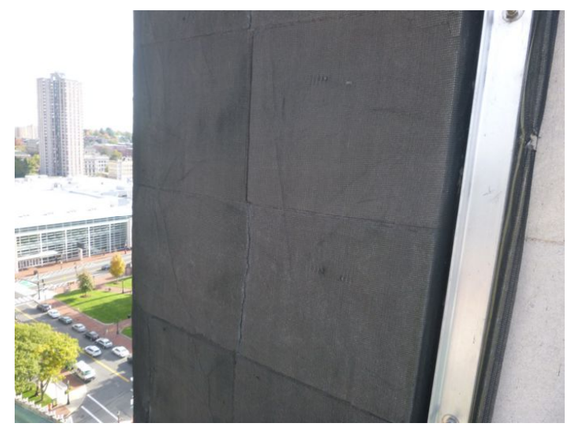
179-45 Stone_Crack System joints 2018-1



179-45 Stone_Crack System joints 2018-2

179-121 Stone_Crack Single unit 2018-1

179-148 Stone_Crack System units and joints 2018-1



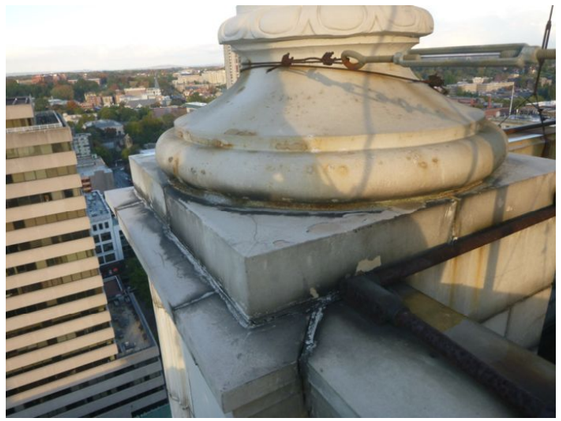
179-157 Stone_Crack Repair failed 2018-1

179-186 Stone_Note Photo-holes in net 2018-1

179-193 TerraCotta_Displacement Horizontal and Vertical 2018-1

179-195 TerraCotta_Spall Bonded 2018-1

179-199 TerraCotta_Crack Single unit 2018-1



179-225 TerraCotta_SoilStain Leached Salts 2018-1

179-229 TerraCotta_SurfLoss Glaze loss 2018-1

180-22 Stone_Joints Mortar Failed 2018-1

180-67 Stone_Spall Missing 2018-1

180-117 Stone_Crack System units and joints 2018-1

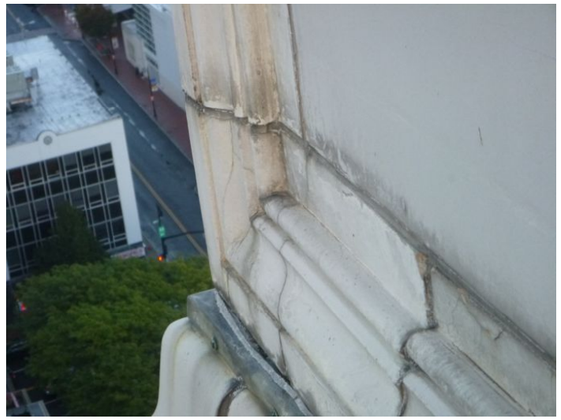
180-129 Stone_Note Photo-probe 2018-1

180-129 Stone_Note Photo-probe 2018-2

180-155 Stone_Crack System joints 2018-1

180-205 TerraCotta_Crack Single unit 2018-1

180-210 TerraCotta_Note Photo-abrasion 2018-1



180-223 TerraCotta_Spall Incipient 2018-1

180-231 TerraCotta_Crack Single unit 2018-1

181-69 Stone_Crack System joints 2018-1

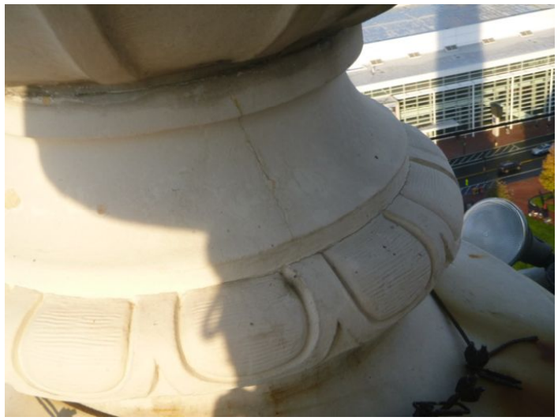
181-111 Stone_Crack System joints 2018-1

181-135 Stone_Crack System joints 2018-1

181-135 Stone_Crack System joints 2018-2

181-156 Stone_Spall Incipient 2018-1

181-221 TerraCotta_SoilStain Biological 2018-1



181-227 TerraCotta_Crack Single unit 2018-1

182-158 Stone_Joints Mortar Missing 2018-1

182-158 Stone_Joints Mortar Missing 2018-2

182-206 TerraCotta_Crack Single unit 2018-1

182-207 TerraCotta_Crack Single unit 2018-1

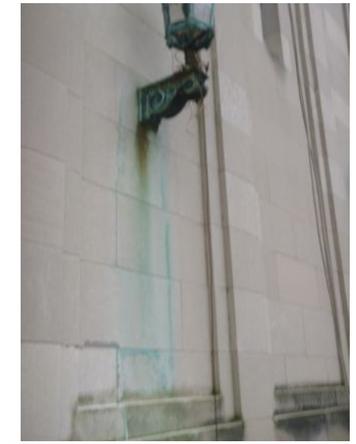
182-230 TerraCotta_SurfLoss Glaze loss 2018-1

182-232 TerraCotta_Crack Single unit 2018-1

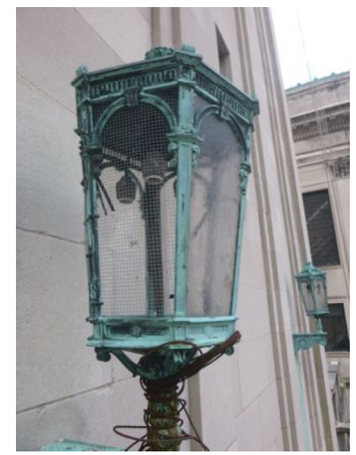
182-233 TerraCotta_Crack Crazing 2018-1

182-237 TerraCotta_SurfLoss Chipped 2018-1

183-25 Stone_Repair Patch Failed 2018-1



183-28 Stone_SoilStain Copper 2018-1



183-31 ArchMetal_Note Photo-general 2018-1

183-31 ArchMetal_Note Photo-general 2018-2

183-31 ArchMetal_Note Photo-general 2018-3

183-31 ArchMetal_Note Photo-general 2018-4

183-41 Stone_Spall Missing 2018-1

183-44 Stone_Spall Missing 2018-1

183-61 Stone_SurfLoss Chipped 2018-1

183-67 Stone_Spall Missing 2018-1

183-86 Stone_Crack System joints 2018-1

183-89 Stone_Repair Patch Sound 2018-1

183-109 Stone_SurfLoss Chipped 2018-1

183-137 Stone_Displacement Horizontal 2018-1

183-155 Stone_SurfLoss Chipped 2018-1

183-202 SheetMetal_Seam Solder Failed 2018-1

183-245 TerraCotta_Crack Single unit 2018-1

184-42 Stone_Displacement Horizontal 2018-1

184-42 Stone_Displacement Horizontal 2018-2

184-201 ArchMetal_Corrosion Perforated 2018-1

184-207 TerraCotta_Note Photo-holes 2018-1

184-222 SheetMetal_Seam Solder Failed 2018-1

184-224 TerraCotta_Crack Crazing 2018-1

184-224 TerraCotta_Crack Crazing 2018-2

184-230 TerraCotta_SurfLoss Chipped 2018-1

184-234 TerraCotta_Crack Single unit 2018-1

184-239 TerraCotta_Crack Single unit 2018-1

184-241 TerraCotta_SurfLoss Glaze loss 2018-1

185-148 Stone_SurfLoss Chipped 2018-1

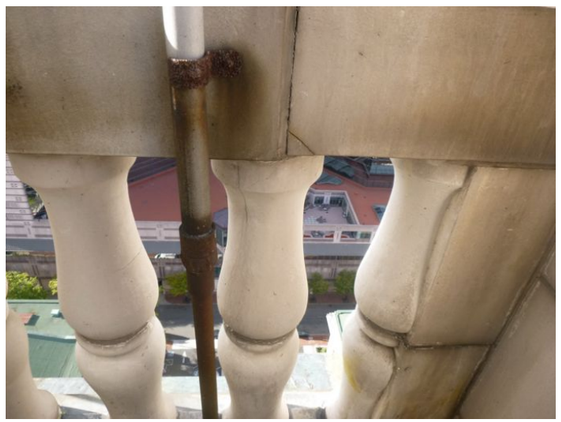
185-195 TerraCotta_Crack Crazing 2018-1

185-195 TerraCotta_Crack Crazing 2018-2

185-195 TerraCotta_Crack Crazing 2018-3

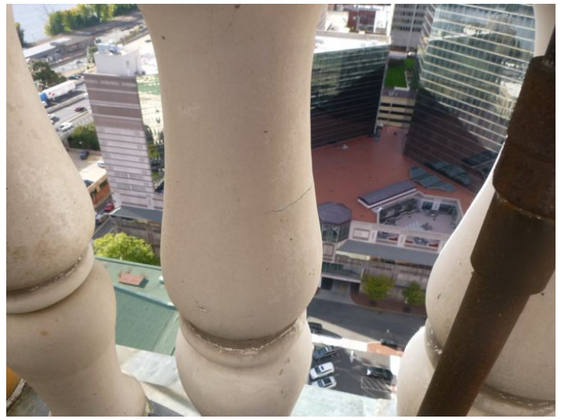
185-205 TerraCotta_SoilStain Leached Salts 2018-1

185-221 TerraCotta_SurfLoss Glaze loss 2018-1



185-227 TerraCotta_Note Photo-cracks at balustrade 2018-1

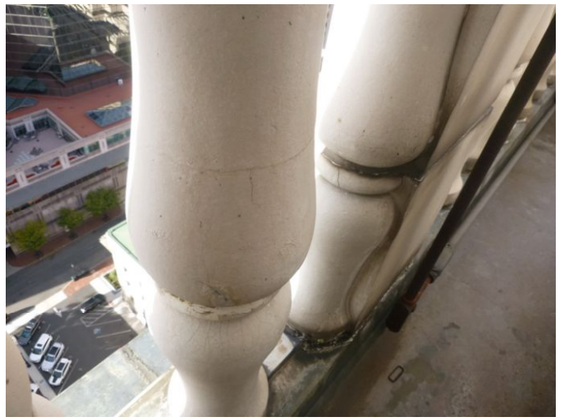
185-227 TerraCotta_Note Photo-cracks at balustrade 2018-2



185-227 TerraCotta_Note Photo-cracks at balustrade 2018-3

185-227 TerraCotta_Note Photo-cracks at balustrade 2018-4

185-227 TerraCotta_Note Photo-cracks at balustrade 2018-5



185-227 TerraCotta_Note Photo-cracks at balustrade 2018-6

185-227 TerraCotta_Note Photo-cracks at balustrade 2018-7

185-227 TerraCotta_Note Photo-cracks at balustrade 2018-8

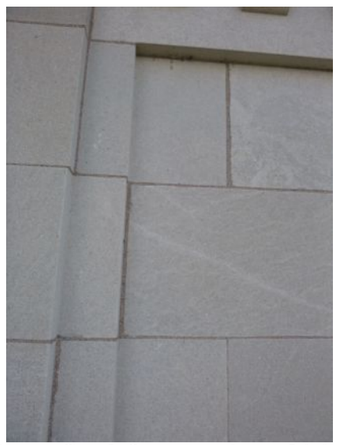
185-227 TerraCotta_Note Photo-cracks at balustrade 2018-9

185-242 TerraCotta_Crack Crazing 2018-1

185-255 TerraCotta_Crack Single unit 2018-1

186-88 Stone_SurfLoss Chipped 2018-1

186-114 Stone_Spall Bonded 2018-1



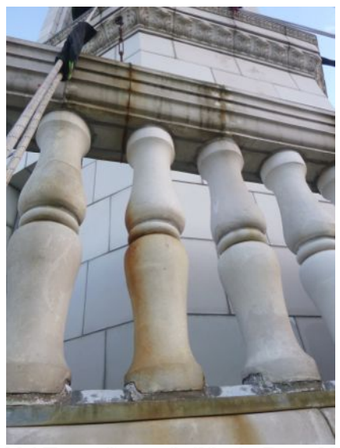
186-166 Stone_Crack System units and joints 2018-1

186-166 Stone_Crack System units and joints 2018-2

186-222 TerraCotta_Crack Single unit 2018-1

186-225 TerraCotta_Crack Single unit 2018-1

186-226 TerraCotta_Crack Single unit 2018-1



186-226 TerraCotta_SoilStain Rust 2018-1

186-233 TerraCotta_Crack Single unit 2018-1

186-235 TerraCotta_Crack Single unit 2018-1

186-236 TerraCotta_Crack Single unit 2018-1

186-253 TerraCotta_Crack Single unit 2018-1

186-256 TerraCotta_Crack Single unit 2018-1

186-256 TerraCotta_Crack Single unit 2018-2

186-256 TerraCotta_Crack Single unit 2018-3

187-60 Stone_Spall Bonded 2018-1

187-203 TerraCotta_Repair Patch Failed 2018-1

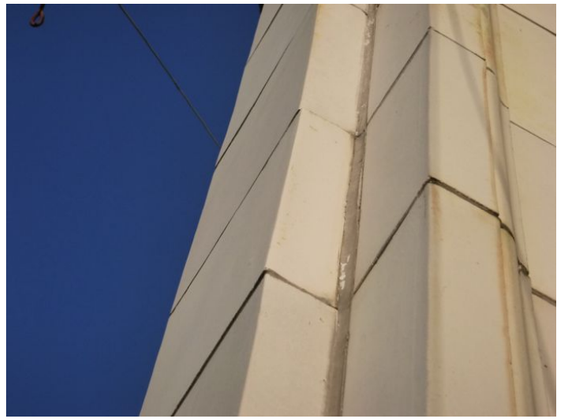
187-219 TerraCotta_SurfLoss Glaze loss 2018-1

187-227 TerraCotta_Crack Crazing 2018-1

187-230 TerraCotta_Crack Repair failed 2018-1

187-230 TerraCotta_Crack Repair failed 2018-2

187-230 TerraCotta_Crack Repair failed 2018-3



187-246 TerraCotta_Displacement Horizontal 2018-1

187-271 TerraCotta_Crack Single unit 2018-1

188-131 Stone_Spall Bonded 2018-1

188-235 TerraCotta_Crack Single unit 2018-1

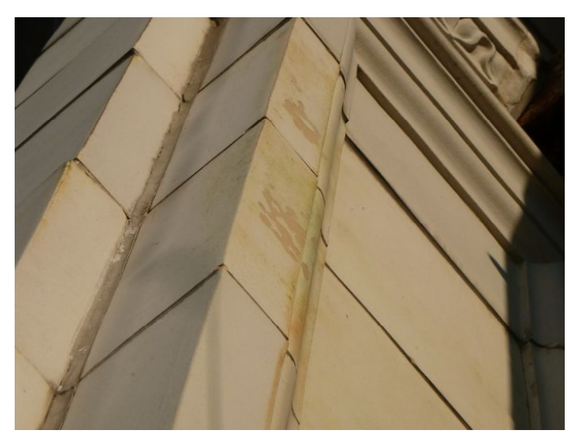
188-239 TerraCotta_SurfLoss Glaze loss 2018-1

188-242 TerraCotta_Repair Patch Failed 2018-1

188-242 TerraCotta_SurfLoss Glaze loss 2018-1

188-242 TerraCotta_SurfLoss Glaze loss 2018-2

188-242 TerraCotta_SurfLoss Glaze loss 2018-3

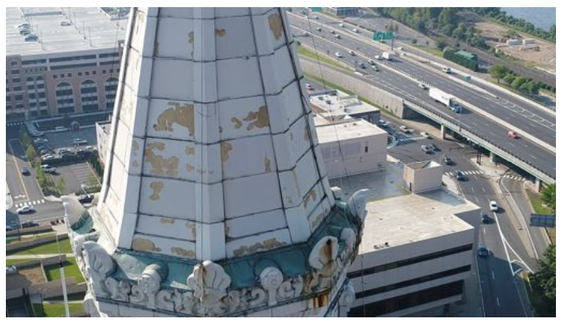


188-246 TerraCotta_SoilStain Rust 2018-1

188-246 TerraCotta_SoilStain Rust 2018-2

188-246 TerraCotta_SoilStain Rust 2018-3

188-271 TerraCotta_Spall Hazardous 2018-1



188-275 TerraCotta_Crack Single unit 2018-1

188-278 TerraCotta_Displacement Horizontal 2018-1

189-26 Stone_SoilStain Atmospheric 2018-1

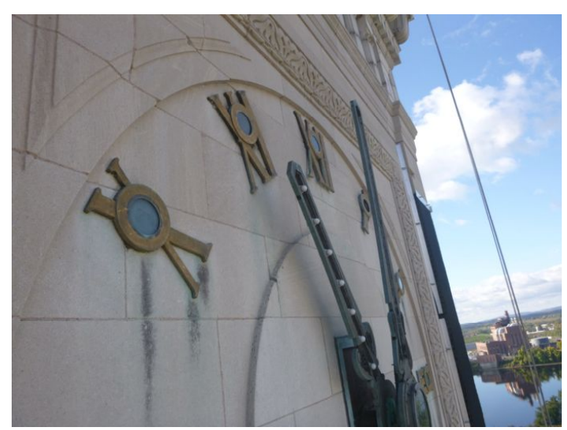
189-37 Wood_Deteriorated Rotten 2018-1

189-37 Wood_Deteriorated Rotten 2018-2

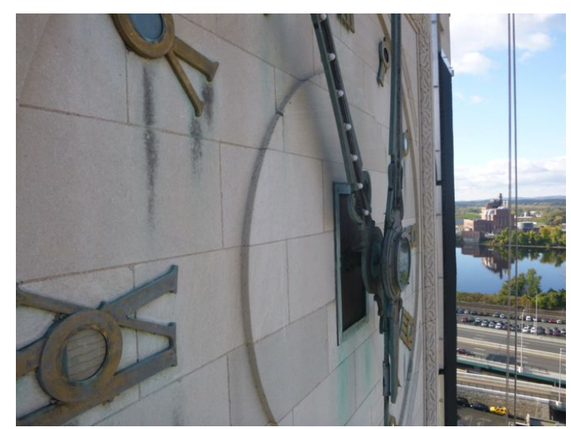
189-37 Wood_Deteriorated Rotten 2018-3

189-150 Wood_Deteriorated Rotten 2018-1

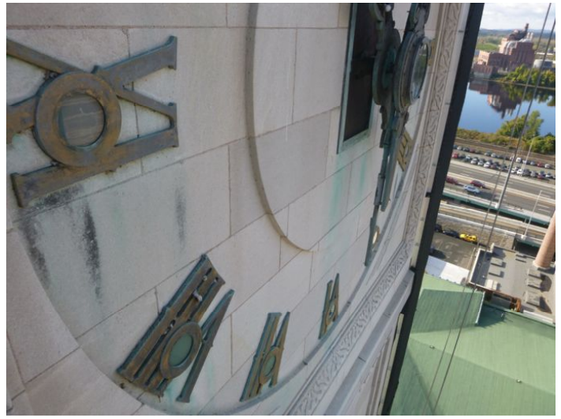
189-150 Wood_Deteriorated Rotten 2018-2



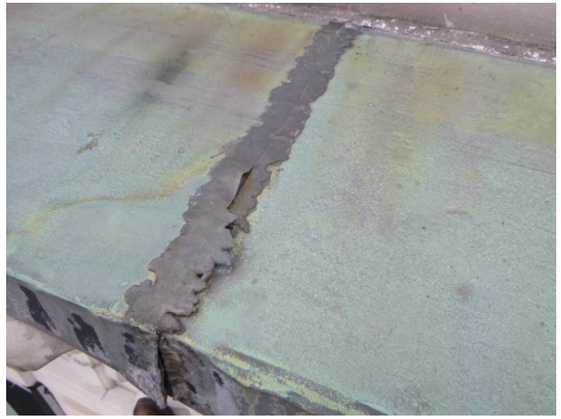
189-181 Stone_Note Photo-northwest clock general 2018-1



189-181 Stone_Note Photo-northwest clock general 2018-2

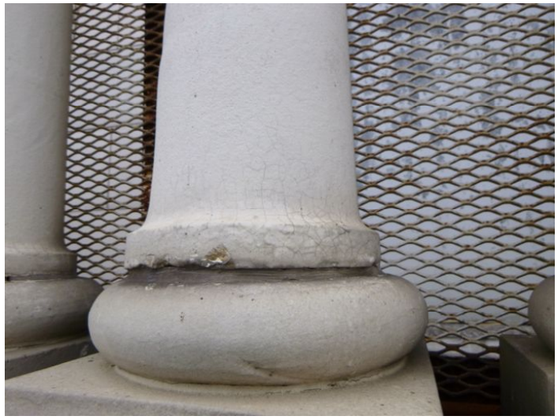


189-181 Stone_Note Photo-northwest clock general 2018-3



189-202 SheetMetal_Seam Solder Failed 2018-1

189-202 SheetMetal_Seam Solder Failed 2018-2



189-204 TerraCotta_Crack Crazing 2018-1

189-204 TerraCotta_Crack Crazing 2018-2

189-223 TerraCotta_Crack System units 2018-1

189-223 TerraCotta_Crack System units 2018-2

189-223 TerraCotta_Crack System units 2018-3

189-228 TerraCotta_SurfLoss Chipped 2018-1

189-234 TerraCotta_Crack Crazing 2018-1

189-234 TerraCotta_Crack Crazing 2018-2

189-234 TerraCotta_Crack Crazing 2018-3

189-234 TerraCotta_Crack Crazing 2018-4

189-236 TerraCotta_Note Photo-typical patch repairs 2018-1

189-236 TerraCotta_Note Photo-typical patch repairs 2018-2

189-236 TerraCotta_Note Photo-typical patch repairs 2018-3

189-257 TerraCotta_Crack Single unit 2018-1

189-257 TerraCotta_Crack Single unit 2018-2

189-270 TerraCotta_SurfLoss Glaze loss 2018-1

189-272 TerraCotta_Joints Mortar Caulked Failed 2018-1

190-23 Stone_SoilStain Atmospheric 2018-1

190-84 Wood_Deteriorated Rotten 2018-1

190-84 Wood_Deteriorated Rotten 2018-2

190-84 Wood_Deteriorated Rotten 2018-3

190-105 Wood_Deteriorated Rotten 2018-1

190-126 Wood_Deteriorated Rotten 2018-1

190-126 Wood_Deteriorated Rotten 2018-2

190-126 Wood_Deteriorated Rotten 2018-3

190-154 Stone_Spall Bonded 2018-1

190-175 ArchMetal_Note Photo-northwest clock 2018-1

190-175 ArchMetal_Note Photo-northwest clock 2018-2

190-226 TerraCotta_Crack Single unit 2018-1

190-229 SheetMetal_Coating Coating Failed 2018-1

190-229 SheetMetal_Coating Coating Failed 2018-2

190-235 TerraCotta_Crack System units 2018-1

190-240 TerraCotta_Crack Single unit 2018-1

190-240 TerraCotta_Crack Single unit 2018-2

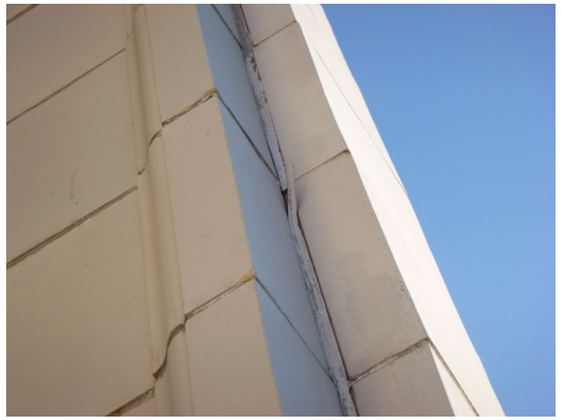
190-240 TerraCotta_Crack Single unit 2018-3

190-240 TerraCotta_Crack Single unit 2018-4

190-251 TerraCotta_Joints Mortar Caulked Failed 2018-1

190-251 TerraCotta_Joints Mortar Caulked Failed 2018-2

190-251 TerraCotta_Joints Mortar Caulked Failed 2018-3



190-251 TerraCotta_Joints Mortar Caulked Failed 2018-4

190-264 TerraCotta_Note Photo-general 2018-1

190-264 TerraCotta_Note Photo-general 2018-2

190-264 TerraCotta_Note Photo-general 2018-3

190-264 TerraCotta_Note Photo-general 2018-4

190-264 TerraCotta_Note Photo-general 2018-5

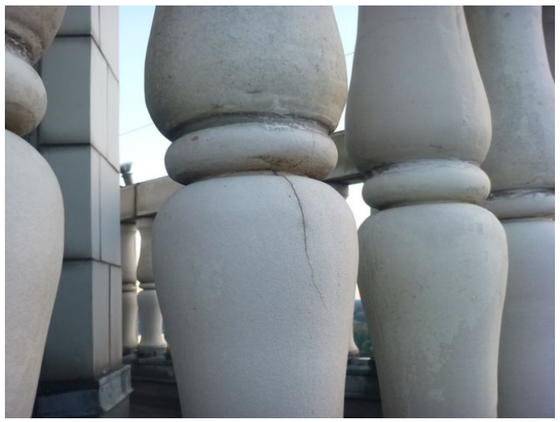
190-268 TerraCotta_Joints Sealant Failed 2018-1

190-287 SheetMetal_Note Photo-finial 2018-1

191-222 SheetMetal_Seam Solder Failed 2018-1

191-224 TerraCotta_Crack System units 2018-1

191-224 TerraCotta_Crack System units 2018-2



191-224 TerraCotta_Crack System units 2018-3

191-224 TerraCotta_Crack System units 2018-4

191-224 TerraCotta_Crack System units 2018-5

191-258 SheetMetal_Seam Solder Failed 2018-1

191-261 TerraCotta_Crack System units and joints 2018-1

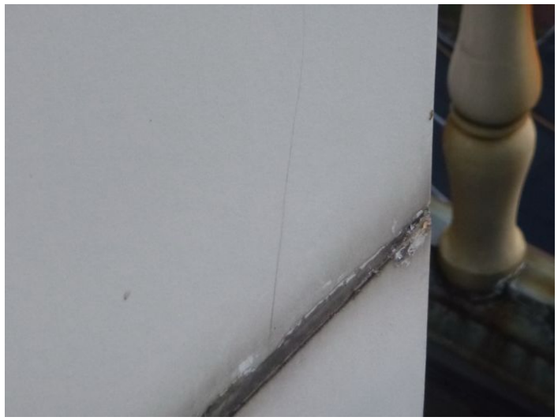
191-268 TerraCotta_SoilStain Rust 2018-1

191-274 TerraCotta_Spall Hazardous 2018-1

192-194 TerraCotta_Spall Missing 2018-1

192-222 TerraCotta_Repair Patch Failed 2018-1

192-222 TerraCotta_Repair Patch Failed 2018-2



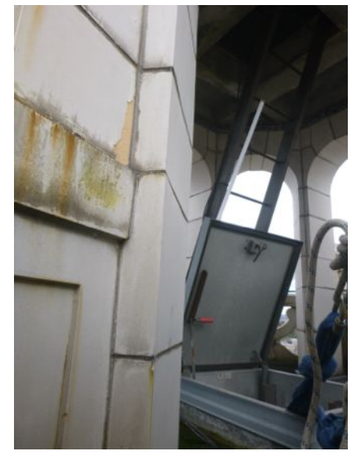
192-232 TerraCotta_Crack Single unit 2018-1

192-238 TerraCotta_SurfLoss Glaze loss 2018-1

192-246 TerraCotta_Displacement Horizontal 2018-1

192-250 TerraCotta_Crack Single unit 2018-1

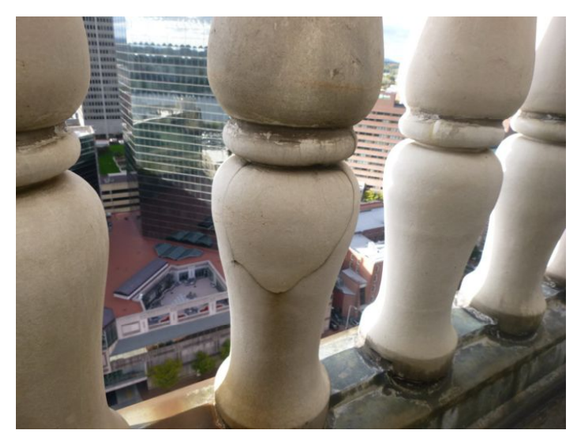
192-262 TerraCotta_Crack Single unit 2018-1



192-265 TerraCotta_Crack System units 2018-1

192-269 TerraCotta_Crack Single unit 2018-1

192-274 TerraCotta_Crack System units and joints 2018-1



193-224 TerraCotta_Spall Bonded 2018-1

193-236 TerraCotta_Crack Crazing 2018-1

193-236 TerraCotta_Crack Crazing 2018-2

193-248 TerraCotta_Joints Mortar Caulked Failed 2018-1

193-248 TerraCotta_Joints Mortar Caulked Failed 2018-2

193-270 SheetMetal_Note Photo-flashing 2018-1

194-42 Stone_Spall Missing 2018-1

194-203 TerraCotta_Crack Crazing 2018-1

194-203 TerraCotta_Crack Crazing 2018-2

194-205 TerraCotta_Displacement Horizontal 2018-1

194-205 TerraCotta_Displacement Horizontal 2018-2

194-205 TerraCotta_Displacement Horizontal 2018-3

194-206 TerraCotta_Spall Missing 2018-1

194-231 TerraCotta_Joints Mortar Caulked Failed 2018-1

194-231 TerraCotta_Joints Mortar Caulked Failed 2018-2

194-238 TerraCotta_Joints Mortar Caulked Failed 2018-1

194-238 TerraCotta_Joints Mortar Caulked Failed 2018-2

194-250 TerraCotta_Spall Incipient 2018-1

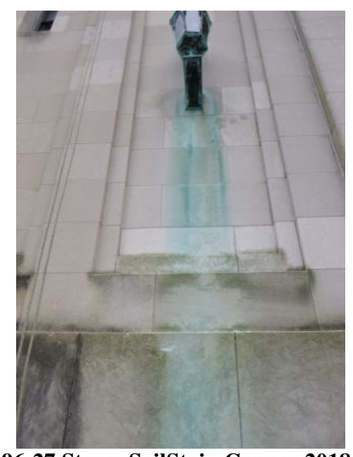
194-252 TerraCotta_Repair Patch Failed 2018-1

194-257 TerraCotta_Crack Single unit 2018-1

194-261 TerraCotta_Crack System units and joints 2018-1

194-265 TerraCotta_Repair Replacement 2018-1

195-244 ArchMetal_Corrosion Surface 2018-1



196-27 Stone_SoilStain Copper 2018-1

196-27 Stone_SoilStain Copper 2018-2

196-43 Stone_Spall Bonded 2018-1

196-129 Stone_Repair Patch Sound 2018-1

196-129 Stone_Repair Patch Sound 2018-2

196-129 Stone_Repair Patch Sound 2018-3

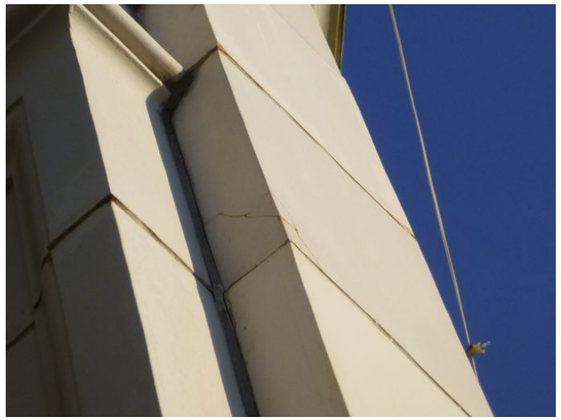
196-203 SheetMetal_Seam Solder Failed 2018-1

196-203 SheetMetal_Seam Solder Failed 2018-2

196-233 TerraCotta_Crack Crazing 2018-1

196-233 TerraCotta_Crack Crazing 2018-2

196-238 TerraCotta_Crack Crazing 2018-1



196-247 TerraCotta_Crack Single unit 2018-1

196-263 TerraCotta_Note Photo-general 2018-1

196-263 TerraCotta_Note Photo-general 2018-2

196-263 TerraCotta_Note Photo-general 2018-3

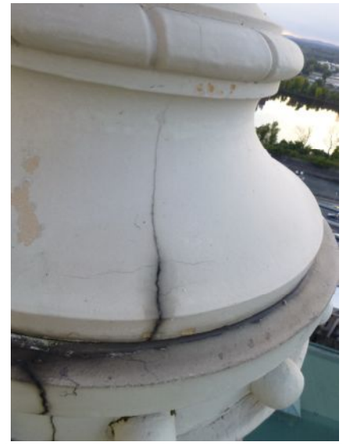
196-263 TerraCotta_Note Photo-general 2018-4

197-126 Stone_Spall Missing 2018-1

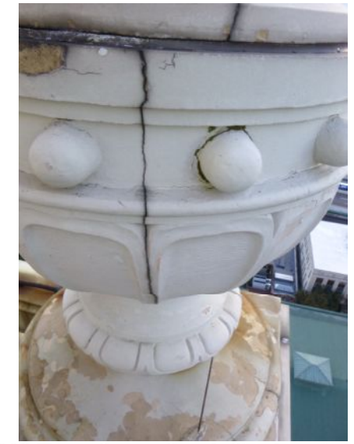
197-131 Stone_SurfLoss Eroded 2018-1

197-191 Stone_Joints Mortar Failed 2018-1

197-206 TerraCotta_Spall Missing 2018-1



197-228 TerraCotta_Crack Single unit 2018-1



197-228 TerraCotta_Crack Single unit 2018-2

197-228 TerraCotta_Crack Single unit 2018-3

198-158 Stone_Displacement Horizontal 2018-1

198-158 Stone_Displacement Horizontal 2018-2

198-159 Stone_Spall Bonded 2018-1

198-162 Stone_Spall Missing 2018-1

198-164 Stone_Joints Mortar Failed 2018-1

198-222 TerraCotta_Crack Crazing 2018-1

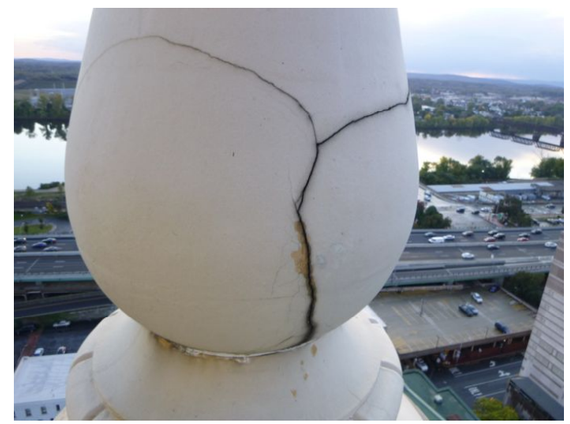
198-223 SheetMetal_Seam Folded Failed 2018-1

198-224 TerraCotta_Joints Mortar Caulked Failed 2018-1

198-224 TerraCotta_Joints Mortar Caulked Failed 2018-2

198-224 TerraCotta_Joints Mortar Caulked Failed 2018-3

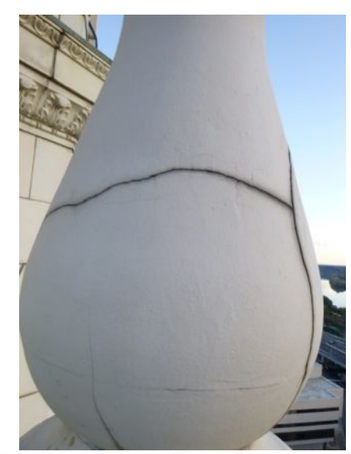
198-224 TerraCotta_Joints Mortar Caulked Failed 2018-4



198-232 TerraCotta_Crack Single unit 2018-1

198-232 TerraCotta_Crack Single unit 2018-2

198-232 TerraCotta_Crack Single unit 2018-3



198-232 TerraCotta_Crack Single unit 2018-4

198-232 TerraCotta_Crack Single unit 2018-5

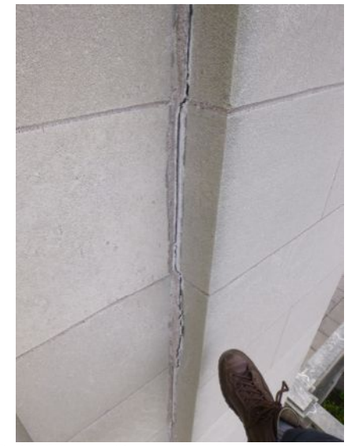
199-63 Stone_Crack System joints 2018-1

199-63 Stone_Crack System joints 2018-2

199-63 Stone_Crack System joints 2018-3

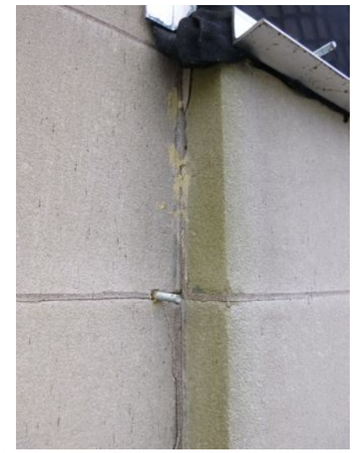
199-63 Stone_Crack System joints 2018-4

199-63 Stone_Crack System joints 2018-5

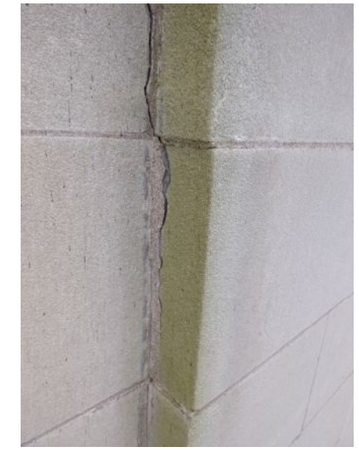


199-63 Stone_Crack System joints 2018-6

199-67 Stone_Repair Patch Failed 2018-1

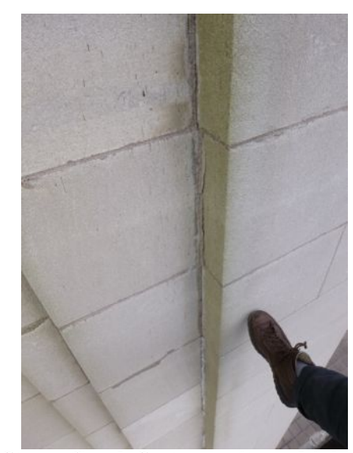


199-87 Stone_Crack System units and joints 2018-1



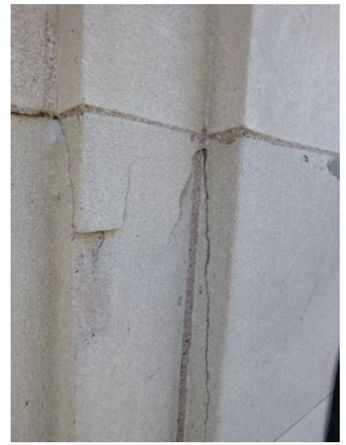
199-87 Stone_Crack System units and joints 2018-2

199-87 Stone_Crack System units and joints 2018-3



199-87 Stone_Crack System units and joints 2018-4

199-124 Stone_Spall Bonded 2018-1



199-124 Stone_Spall Bonded 2018-2

199-189 Stone_Spall Missing 2018-1

199-189 Stone_Spall Missing 2018-2

199-196 TerraCotta_Crack Crazing 2018-1

199-196 TerraCotta_Crack Crazing 2018-2

199-204 TerraCotta_Crack Crazing 2018-1

199-226 TerraCotta_SurfLoss Glaze loss 2018-1

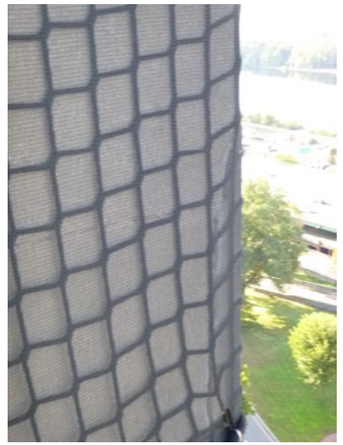
199-226 TerraCotta_SurfLoss Glaze loss 2018-2

199-226 TerraCotta_SurfLoss Glaze loss 2018-3

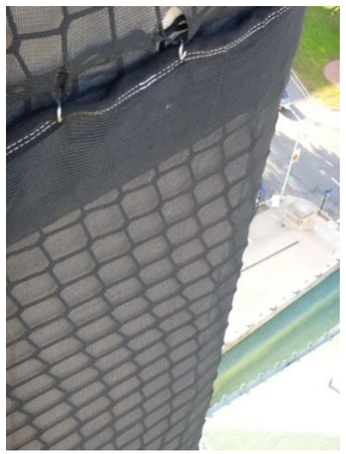
200-190 Stone_Crack Single unit 2018-1

201-114 Stone_Crack System units and joints 2018-1

201-114 Stone_Crack System units and joints 2018-2

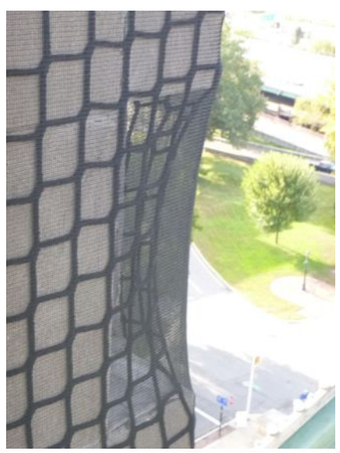


201-160 Stone_Crack System units and joints 2018-1



201-160 Stone_Crack System units and joints 2018-2

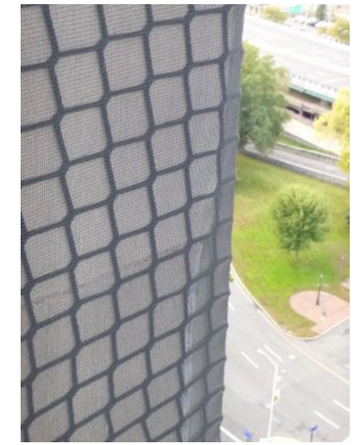
202-96 Stone_Crack System units and joints 2018-1



202-124 Stone_Spall Hazardous 2018-1

202-148 Stone_Crack System units and joints 2018-1

202-148 Stone_Crack System units and joints 2018-2



202-183 Stone_Crack System units and joints 2018-1

202-183 Stone_Crack System units and joints 2018-2

202-203 TerraCotta_Note Inverted weeps 2018-1

202-203 TerraCotta_Note Inverted weeps 2018-2

202-203 TerraCotta_Note Inverted weeps 2018-3

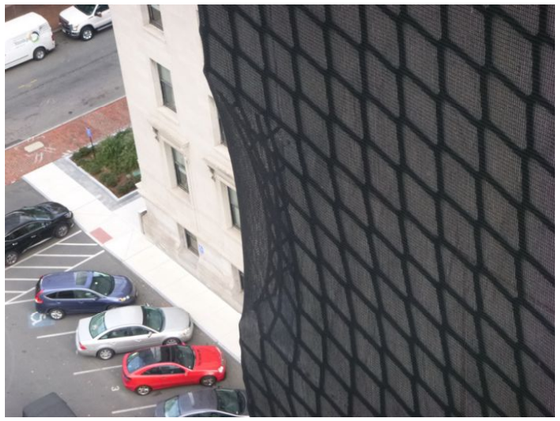
202-203 TerraCotta_Note Inverted weeps 2018-4

202-203 TerraCotta_Note Inverted weeps 2018-5

203-207 TerraCotta_Repair Patch Failed 2018-1

203-207 TerraCotta_Repair Patch Failed 2018-2

256-128 Stone_Unsecured Missing 2018-1



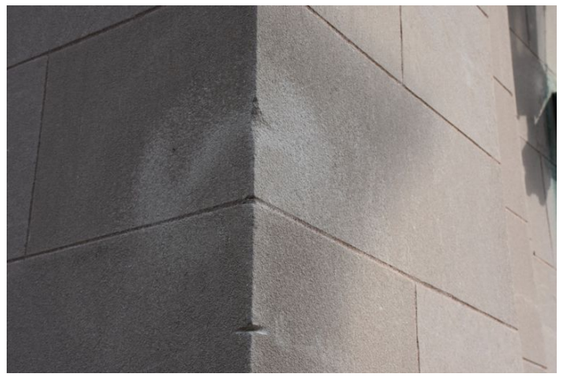
256-128 Stone_Unsecured Missing 2018-2

256-199 TerraCotta_Crack Single unit 2018-1

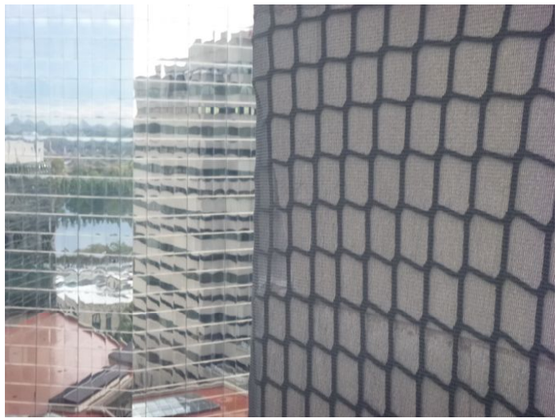
256-230 TerraCotta_Note Photo-urn 2018-1

256-230 TerraCotta_Note Photo-urn 2018-2

257-22 Stone_Note Photo _ corner damage 2018-1

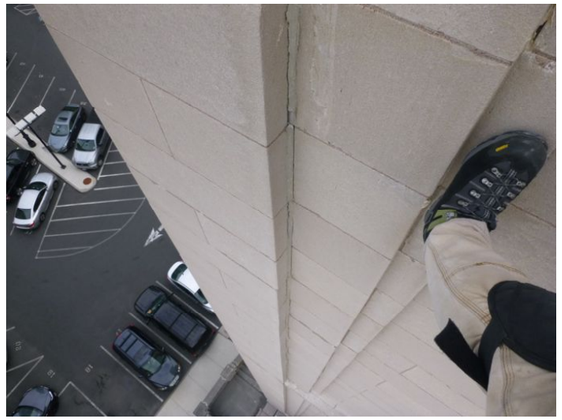


257-22 Stone_Note Photo _ corner damage 2018-2



257-174 Stone_Spall Missing 2018-1

258-29 Stone_Crack System units and joints 2018-1



258-29 Stone_Crack System units and joints 2018-2

258-29 Stone_Crack System units and joints 2018-3

258-193 TerraCotta_SurfLoss Glaze loss 2018-1

258-222 TerraCotta_Joints Mortar Caulked Failed 2018-1

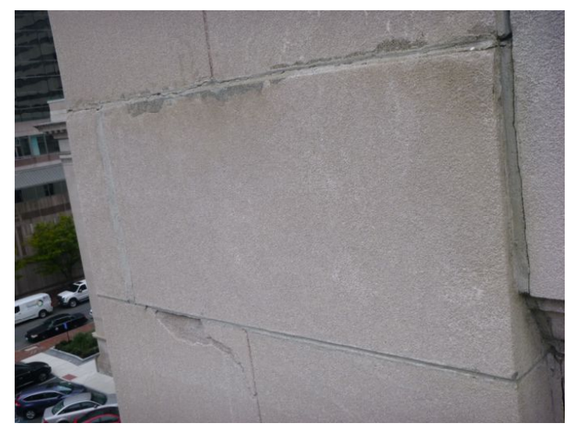
258-222 TerraCotta_Joints Mortar Caulked Failed 2018-2

258-222 TerraCotta_Joints Mortar Caulked Failed 2018-3

258-227 TerraCotta_Crack Single unit 2018-1

259-21 Stone_SoilStain Atmospheric 2018-1

259-71 Stone_Displacement Horizontal 2018-1



259-71 Stone_Displacement Horizontal 2018-2

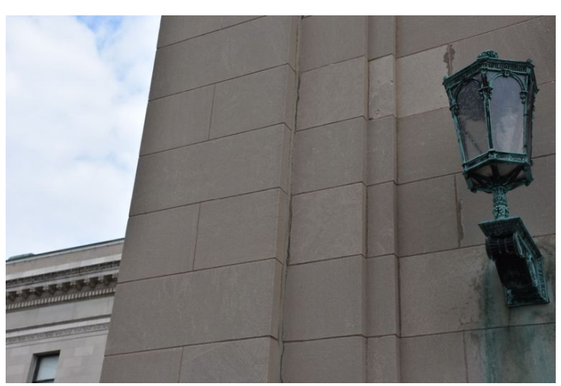
259-90 Stone_Spall Incipient 2018-1

259-90 Stone_Spall Incipient 2018-2

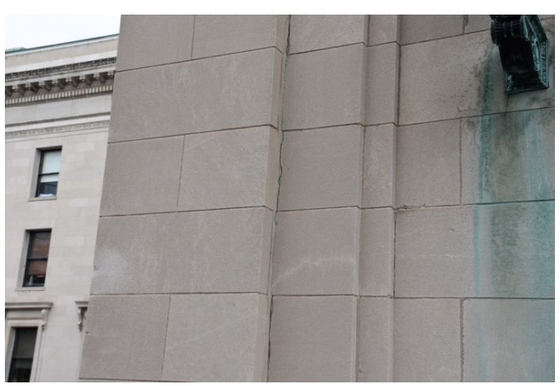
259-191 Stone_Crack System joints 2018-1

259-191 Stone_Crack System joints 2018-2

259-204 TerraCotta_Crack Crazing 2018-1



260-33 Stone_Crack System joints 2018-1



260-33 Stone_Crack System joints 2018-2

260-33 Stone_Crack System joints 2018-3

260-33 Stone_Crack System joints 2018-4

260-129 Stone_Spall Incipient 2018-1

260-135 Stone_Displacement Horizontal 2018-1

260-135 Stone_Displacement Horizontal 2018-2

260-230 TerraCotta_Spall Missing 2018-1

261-74 Stone_Spall Missing 2018-1

261-87 Stone_Spall Bonded 2018-1

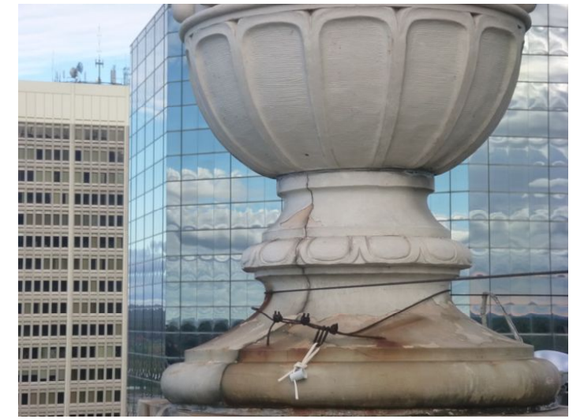
261-87 Stone_Spall Bonded 2018-2

261-109 Stone_Spall Missing 2018-1

261-109 Stone_Spall Missing 2018-2

261-109 Stone_Spall Missing 2018-3

261-227 TerraCotta_Crack Single unit 2018-1



261-227 TerraCotta_Crack Single unit 2018-2

261-232 TerraCotta_Crack Single unit 2018-1

261-232 TerraCotta_Crack Single unit 2018-2

262-28 Stone_Crack System units and joints 2018-1

262-92 Stone_Crack System units 2018-1

262-120 Stone_Spall Missing 2018-1

262-120 Stone_Spall Missing 2018-2

262-132 Stone_Spall Missing 2018-1

262-132 Stone_Spall Missing 2018-2

262-165 Stone_Spall Incipient 2018-1

262-165 Stone_Spall Incipient 2018-2

262-165 Stone_Spall Incipient 2018-3

262-167 Stone_Spall Bonded 2018-1

262-167 Stone_Spall Bonded 2018-2

262-173 Stone_Spall Bonded 2018-1

262-189 Stone_Spall Bonded 2018-1

262-189 Stone_Spall Bonded 2018-2

262-192 Stone_Spall Bonded 2018-1

262-192 Stone_Spall Bonded 2018-2

263-36 Stone_Spall Bonded 2018-1

263-64 Stone_Spall Incipient 2018-1

263-64 Stone_Spall Incipient 2018-2

263-75 Stone_Spall Bonded 2018-1

263-85 Stone_Note Photo-chipped stone at joints 2018-1

263-85 Stone_Note Photo-chipped stone at joints 2018-2

263-85 Stone_Note Photo-chipped stone at joints 2018-3

263-85 Stone_Note Photo-chipped stone at joints 2018-4

263-85 Stone_Note Photo-chipped stone at joints 2018-5

263-85 Stone_Note Photo-chipped stone at joints 2018-6

263-89 Stone_Crack Single unit 2018-1

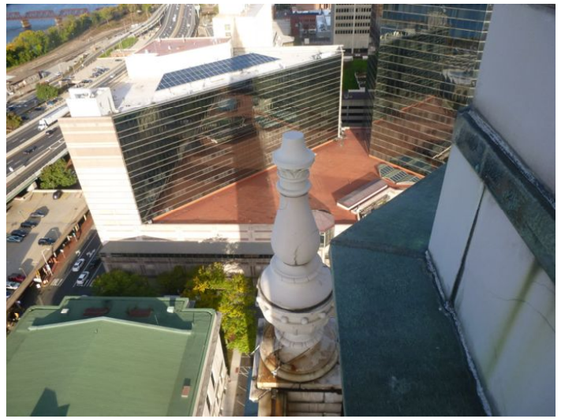
263-157 Stone_Spall Missing 2018-1

263-157 Stone_Spall Missing 2018-2

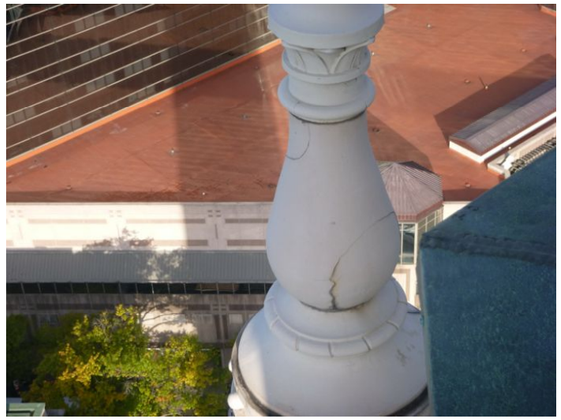
263-167 Stone_Spall Removed 2018-1

263-167 Stone_Spall Removed 2018-2

263-191 Stone_Crack System joints 2018-1



263-229 TerraCotta_Crack Single unit 2018-1



263-229 TerraCotta_Crack Single unit 2018-2

264-24 Stone_SoilStain Copper 2018-1

264-24 Stone_SoilStain Copper 2018-2

264-34 Stone_Spall Bonded 2018-1

264-103 Stone_Spall Missing 2018-1

264-133 Stone_Displacement Horizontal 2018-1

264-133 Stone_Displacement Horizontal 2018-2

264-155 Stone_Spall Bonded 2018-1

264-158 Stone_Displacement Horizontal 2018-1

264-158 Stone_Displacement Horizontal 2018-2

264-158 Stone_Displacement Horizontal 2018-3

264-198 SheetMetal_Seam Solder Failed 2018-1

264-198 SheetMetal_Seam Solder Failed 2018-2

264-203 TerraCotta_Spall Missing 2018-1

265-21 Stone_SoilStain Black Crusts 2018-1

265-35 Stone_Spall Bonded 2018-1

265-55 Stone_Spall Bonded 2018-1

265-55 Stone_Spall Bonded 2018-2

265-55 Stone_Spall Bonded 2018-3

265-89 Stone_Spall Missing 2018-1

265-89 Stone_Spall Missing 2018-2

265-89 Stone_Spall Missing 2018-3

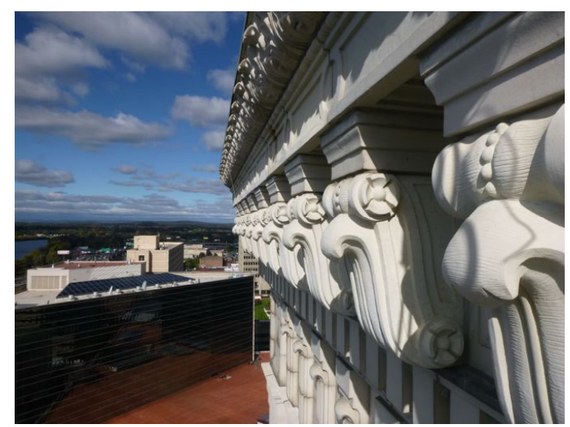
265-89 Stone_Spall Missing 2018-4

265-110 Stone_Spall Incipient 2018-1

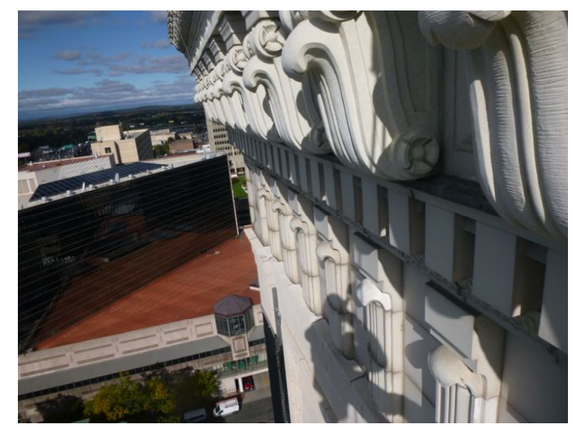
265-110 Stone_Spall Incipient 2018-2

265-126 Stone_Crack Single unit 2018-1

265-129 Stone_Spall Incipient 2018-1



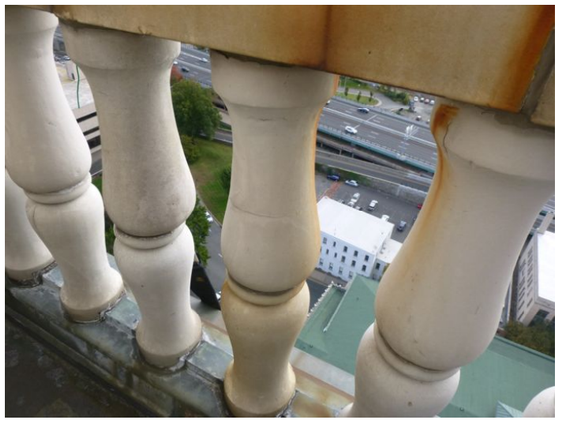
265-197 TerraCotta_Note Photo-overall 2018-1



265-197 TerraCotta_Note Photo-overall 2018-2

265-197 TerraCotta_Note Photo-overall 2018-3

265-223 TerraCotta_Spall Missing 2018-1



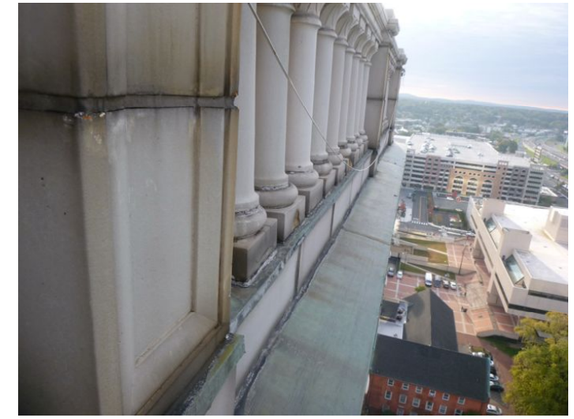
265-227 TerraCotta_Crack Single unit 2018-1

266-22 Stone_Repair Dutchman Sound 2018-1

266-272 TerraCotta_SurfLoss Glaze loss 2018-1

267-34 Stone_Repair Patch Failed 2018-1

267-34 Stone_Repair Patch Failed 2018-2



267-203 TerraCotta_Spall Missing 2018-1

267-203 TerraCotta_Spall Missing 2018-2

267-206 TerraCotta_Spall Bonded 2018-1

267-206 TerraCotta_Spall Bonded 2018-2

267-220 TerraCotta_SurfLoss Chipped 2018-1

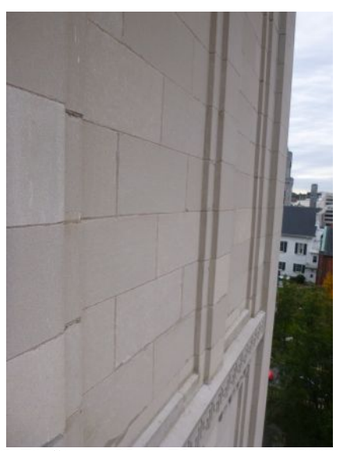
267-226 TerraCotta_Crack Single unit 2018-1

267-233 TerraCotta_Crack Single unit 2018-1

267-238 TerraCotta_Crack Crazing 2018-1

267-268 TerraCotta_SoilStain Copper 2018-1

267-273 TerraCotta_SurfLoss Glaze loss 2018-1



268-71 Stone_Note Photo-spalls 2018-1

268-71 Stone_Note Photo-spalls 2018-2

268-93 Stone_Spall Bonded 2018-1

268-93 Stone_Spall Bonded 2018-2

268-93 Stone_Spall Bonded 2018-3

268-96 Stone_Crack System units and joints 2018-1

268-224 TerraCotta_Crack Single unit 2018-1

268-224 TerraCotta_Crack Single unit 2018-2

268-227 TerraCotta_Crack Single unit 2018-1

268-239 TerraCotta_Repair Patch Failed 2018-1

268-239 TerraCotta_Repair Patch Failed 2018-2

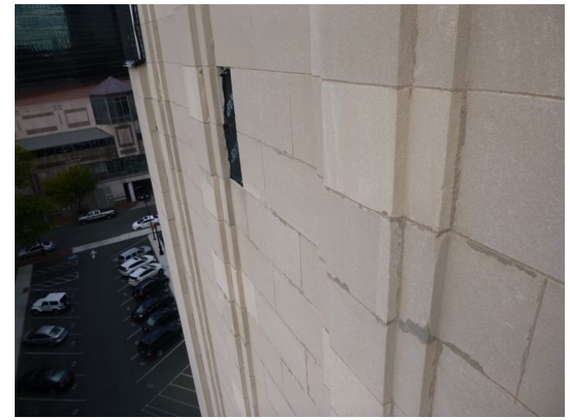
268-271 TerraCotta_SurfLoss Glaze loss 2018-1

268-272 TerraCotta_Joints Mortar Caulked 2018-1

268-273 TerraCotta_Crack System units and joints 2018-1

268-273 TerraCotta_Spall Bonded 2018-1

268-274 TerraCotta_Spall Hazardous 2018-1



269-90 Stone_Displacement Horizontal 2018-1

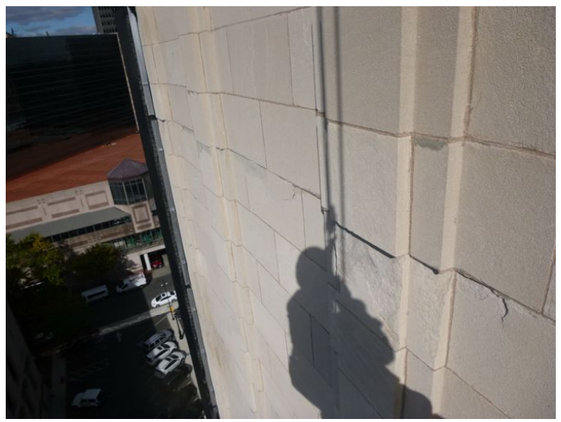
269-90 Stone_Displacement Horizontal 2018-2

269-90 Stone_Displacement Horizontal 2018-3

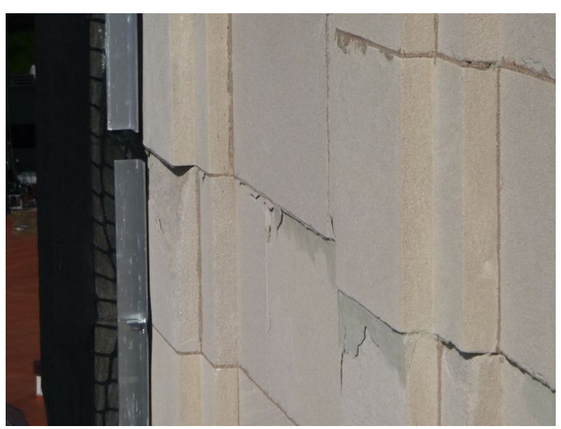
269-90 Stone_Displacement Horizontal 2018-4

269-129 Stone_Spall Bonded 2018-1

269-129 Stone_Spall Bonded 2018-2



269-130 Stone_Spall Hazardous 2018-1



269-130 Stone_Spall Hazardous 2018-2

269-130 Stone_Spall Hazardous 2018-3

269-130 Stone_Spall Hazardous 2018-4

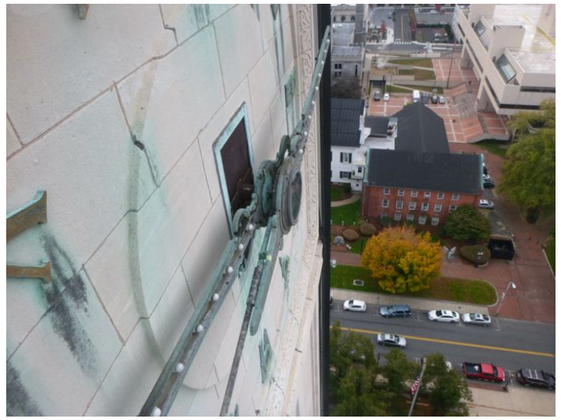
269-130 Stone_Spall Hazardous 2018-5

269-130 Stone_Spall Hazardous 2018-6

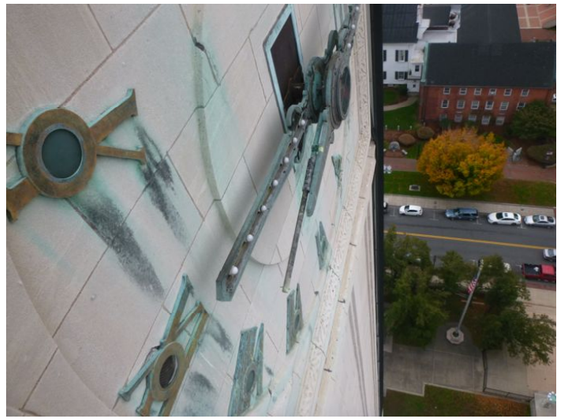
269-130 Stone_Spall Hazardous 2018-7

269-130 Stone_Spall Hazardous 2018-8

269-161 Stone_SurfLoss Chipped 2018-1



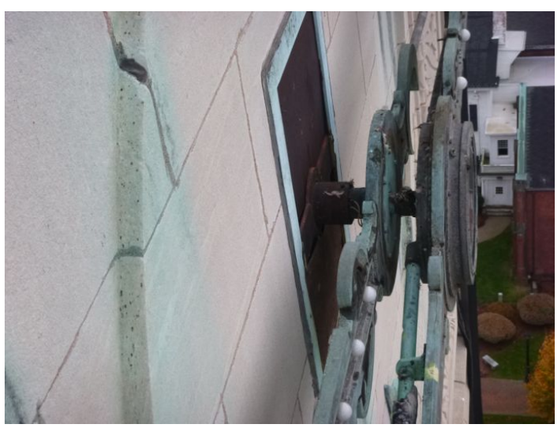
269-182 Stone_Note Photo-southwest clock 2018-1



269-182 Stone_Note Photo-southwest clock 2018-2

269-182 Stone_Note Photo-southwest clock 2018-3

269-182 Stone_Note Photo-southwest clock 2018-4

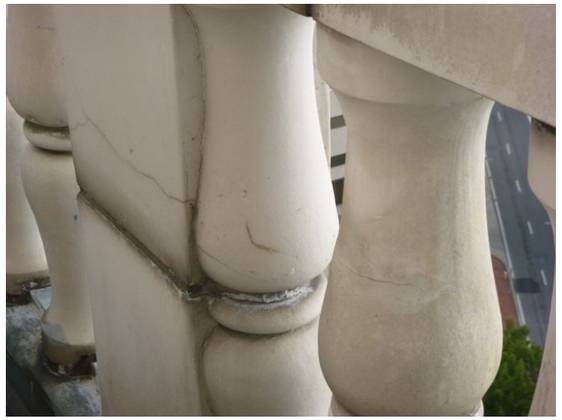


269-182 Stone_Note Photo-southwest clock 2018-5

269-182 Stone_Note Photo-southwest clock 2018-6

269-182 Stone_Note Photo-southwest clock 2018-7

269-182 Stone_Note Photo-southwest clock 2018-8



269-226 TerraCotta_Crack Single unit 2018-1

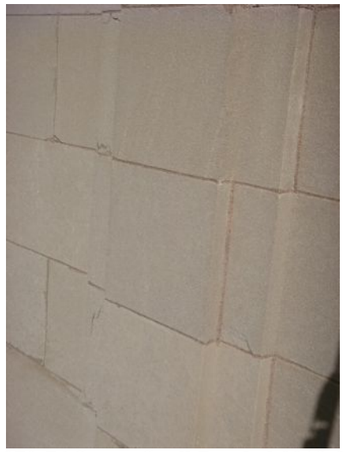
269-226 TerraCotta_Crack Single unit 2018-2

269-231 TerraCotta_Crack Single unit 2018-1

269-256 TerraCotta_Crack Single unit 2018-1

269-264 TerraCotta_Crack System units 2018-1

270-76 Stone_Spall Bonded 2018-1



270-76 Stone_Spall Bonded 2018-2

270-76 Stone_Spall Bonded 2018-3

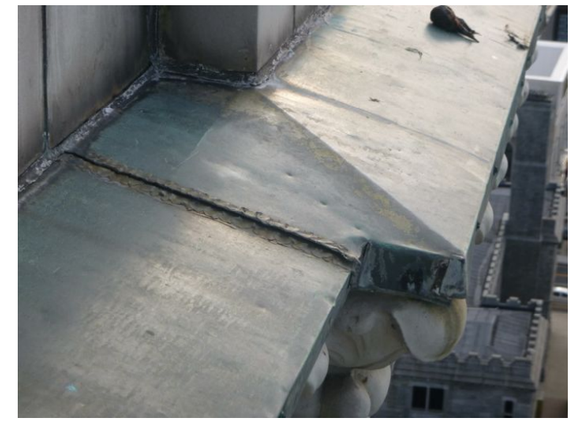
270-76 Stone_Spall Bonded 2018-4

270-88 Stone_Spall Bonded 2018-1

270-103 Stone_Spall Incipient 2018-1

270-188 Stone_Spall Missing 2018-1

270-199 TerraCotta_SoilStain Rust 2018-1



270-221 SheetMetal_Seam Solder Failed 2018-1

270-221 SheetMetal_Seam Solder Failed 2018-2

270-221 SheetMetal_Seam Solder Failed 2018-3

270-225 TerraCotta_Crack Crazing 2018-1

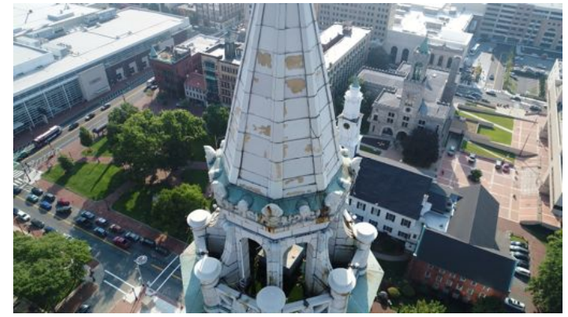
270-262 TerraCotta_Note Photo-general 2018-1

270-262 TerraCotta_Note Photo-general 2018-2

270-262 TerraCotta_Note Photo-general 2018-3

270-262 TerraCotta_Note Photo-general 2018-4

270-262 TerraCotta_Note Photo-general 2018-5



270-281 TerraCotta_Note Photo-general 2018-1

271-25 ArchMetal_Note Photo-general 2018-1

271-25 ArchMetal_Note Photo-general 2018-2

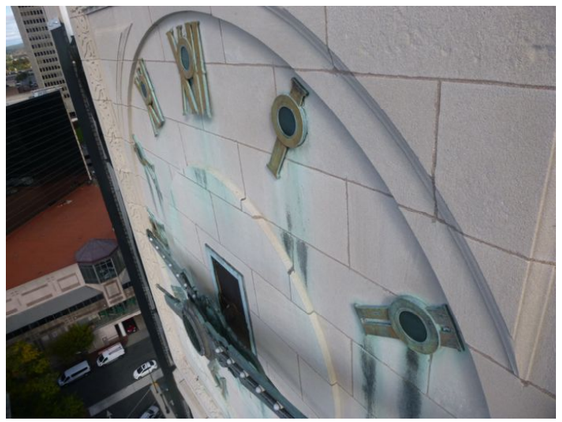
271-25 ArchMetal_Note Photo-general 2018-3

271-85 Stone_Spall Bonded 2018-1

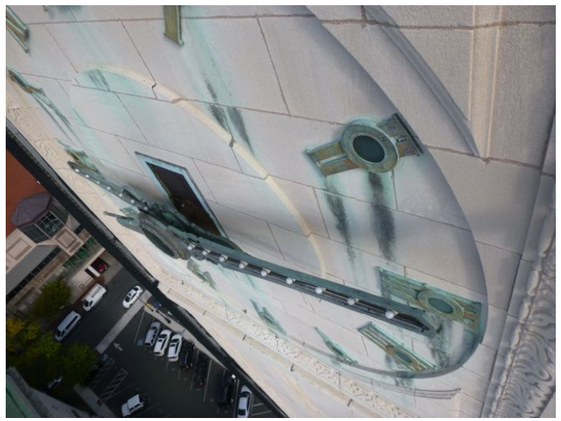
271-85 Stone_Spall Bonded 2018-2

271-86 Stone_Spall Bonded 2018-1

271-159 Stone_Spall Incipient 2018-1

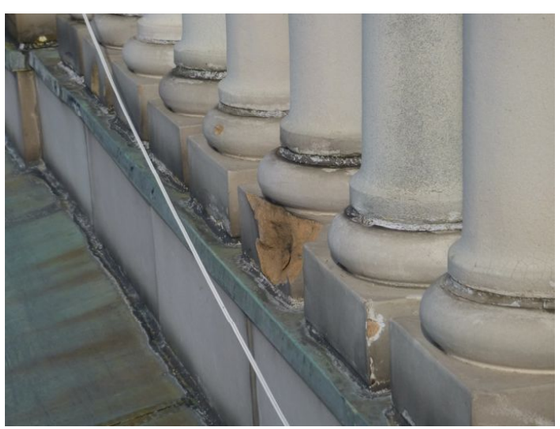


271-178 Stone_SoilStain Copper 2018-1



271-178 Stone_SoilStain Copper 2018-2

271-203 TerraCotta_Spall Missing 2018-1



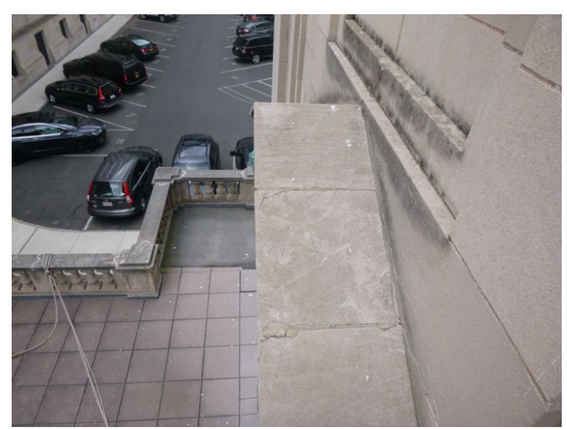
271-203 TerraCotta_Spall Missing 2018-2

271-226 TerraCotta_Crack Crazing 2018-1

271-226 TerraCotta_Crack Crazing 2018-2

271-272 TerraCotta_Spall Bonded 2018-1

271-276 TerraCotta_Displacement Horizontal 2018-1

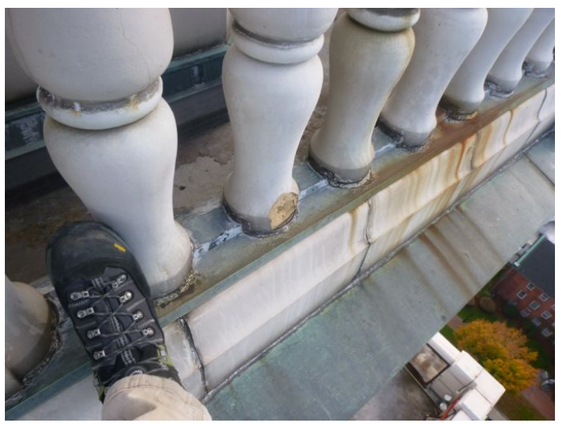


272-35 Stone_Spall Bonded 2018-1

272-35 Stone_Spall Bonded 2018-2

272-35 Stone_Spall Bonded 2018-3

272-76 Stone_Crack Single unit 2018-1



272-223 TerraCotta_Spall Missing 2018-1

272-223 TerraCotta_Spall Missing 2018-2

272-237 TerraCotta_Spall Bonded 2018-1

272-259 TerraCotta_Spall Removed 2018-1

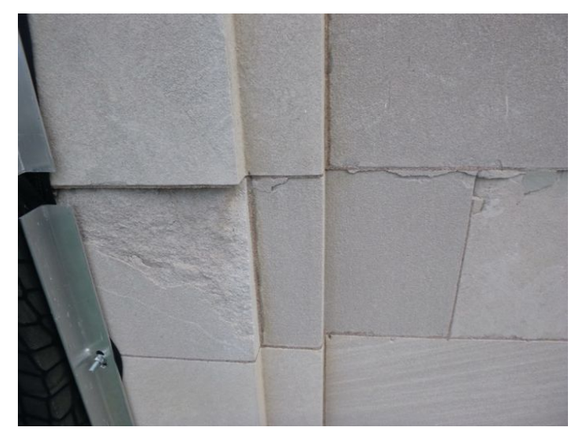
272-259 TerraCotta_Spall Removed 2018-2

272-268 TerraCotta_Crack Single unit 2018-1

272-273 TerraCotta_Crack Single unit 2018-1

273-68 Stone_Spall Bonded 2018-1

273-88 Stone_Spall Bonded 2018-1



273-127 Stone_Note Photo-spalling and displacement 2018-1

273-127 Stone_Note Photo-spalling and displacement 2018-2

273-127 Stone_Note Photo-spalling and displacement 2018-3

273-127 Stone_Note Photo-spalling and displacement 2018-4

273-127 Stone_Note Photo-spalling and displacement 2018-5

273-127 Stone_Note Photo-spalling and displacement 2018-6

273-133 Stone_Crack Single unit 2018-1

273-236 TerraCotta_Crack Crazing 2018-1

273-236 TerraCotta_Crack Crazing 2018-2

273-236 TerraCotta_Crack Crazing 2018-3

273-236 TerraCotta_Crack Crazing 2018-4

273-250 TerraCotta_Crack Single unit 2018-1

273-260 TerraCotta_Crack Single unit 2018-1

273-264 TerraCotta_Crack Single unit 2018-1

274-80 Stone_Crack Single unit 2018-1

274-85 Stone_Crack Single unit 2018-1

274-90 Stone_Displacement Horizontal 2018-1

274-90 Stone_Displacement Horizontal 2018-2

274-161 Stone_Crack Single unit 2018-1

274-161 Stone_Crack Single unit 2018-2

274-184 Stone_Spall Incipient 2018-1

274-184 Stone_Spall Incipient 2018-2

274-223 TerraCotta_Spall Missing 2018-1

274-224 TerraCotta_Crack Crazing 2018-1

274-227 TerraCotta_Note Photo-hairline cracks at balustrade 2018-1

274-227 TerraCotta_Note Photo-hairline cracks at balustrade 2018-2

274-227 TerraCotta_Note Photo-hairline cracks at balustrade 2018-3

274-227 TerraCotta_Note Photo-hairline cracks at balustrade 2018-4

274-232 TerraCotta_Crack Crazing 2018-1

274-232 TerraCotta_Crack Crazing 2018-2

274-232 TerraCotta_Crack Crazing 2018-3

274-253 TerraCotta_Crack Single unit 2018-1

274-259 TerraCotta_Spall Incipient 2018-1

274-265 TerraCotta_Note Photo-general 2018-1

274-265 TerraCotta_Note Photo-general 2018-2

274-270 TerraCotta_Spall Bonded 2018-1

274-274 TerraCotta_Crack Single unit 2018-1

275-23 Stone_Repair Dutchman Sound 2018-1

275-34 Stone_Spall Missing 2018-1

275-51 Stone_Spall Missing 2018-1

275-64 Stone_Spall Bonded 2018-1

275-157 Stone_Spall Incipient 2018-1

275-224 TerraCotta_Crack Single unit 2018-1

275-247 TerraCotta_Crack System units and joints 2018-1

275-257 TerraCotta_Crack Single unit 2018-1

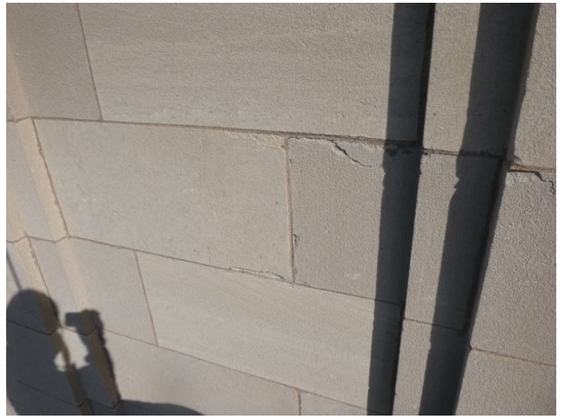
275-259 TerraCotta_Spall Bonded 2018-1

275-271 TerraCotta_SoilStain Rust 2018-1

276-35 Stone_Spall Bonded 2018-1

276-63 Stone_Spall Bonded 2018-1

276-63 Stone_Spall Bonded 2018-2



276-129 Stone_Spall Missing 2018-1

276-134 Stone_Spall Missing 2018-1

276-257 TerraCotta_Crack Single unit 2018-1

277-26 Stone_SoilStain Copper 2018-1

277-28 Stone_Crack System units and joints 2018-1

277-34 Stone_Spall Missing 2018-1

277-34 Stone_Spall Missing 2018-2

277-71 Stone_Repair Patch Failed 2018-1

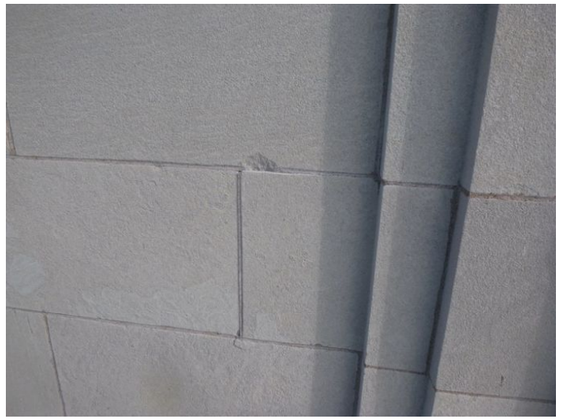
277-130 Stone_Spall Bonded 2018-1

277-132 Stone_Crack Single unit 2018-1

277-132 Stone_Crack Single unit 2018-2

277-166 Stone_Spall Incipient 2018-1

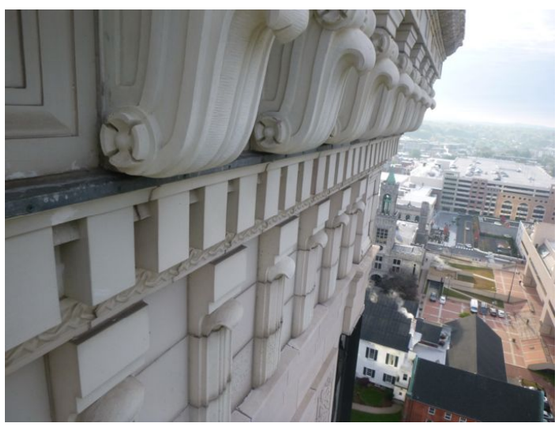
277-166 Stone_Spall Incipient 2018-2



277-167 Stone_Spall Missing 2018-1

277-167 Stone_Spall Missing 2018-2

277-197 TerraCotta_Note Photo-overall 2018-1



277-197 TerraCotta_Note Photo-overall 2018-2

277-197 TerraCotta_Note Photo-overall 2018-3

277-197 TerraCotta_Note Photo-overall 2018-4

277-197 TerraCotta_Note Photo-overall 2018-5

277-256 TerraCotta_Crack System units and joints 2018-1

277-256 TerraCotta_Crack System units and joints 2018-2

277-262 TerraCotta_Crack Single unit 2018-1

278-31 Stone_Spall Incipient 2018-1

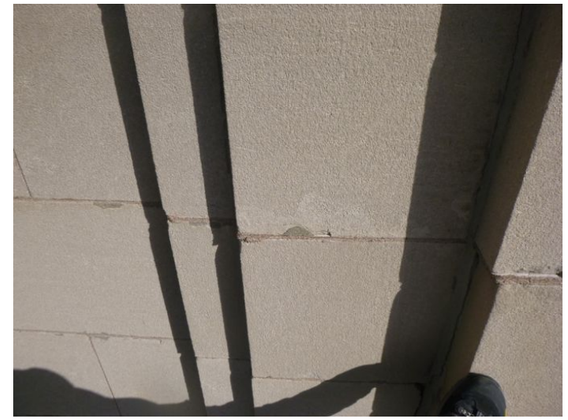
278-34 Stone_Spall Incipient 2018-1

278-44 Stone_Spall Bonded 2018-1

278-129 Stone_Spall Incipient 2018-1

278-163 Stone_Crack Single unit 2018-1

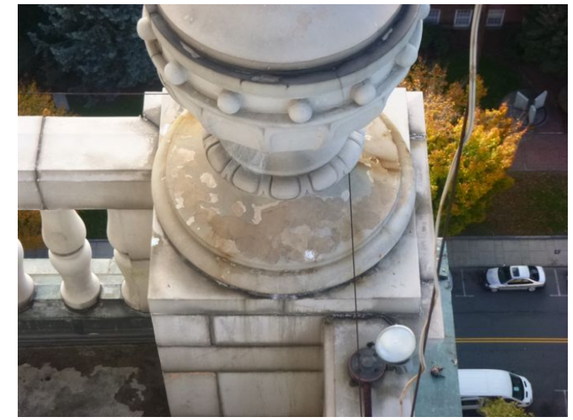
278-215 TerraCotta_Spall Bonded 2018-1



279-90 Stone_Spall Bonded 2018-1

279-90 Stone_Spall Bonded 2018-2

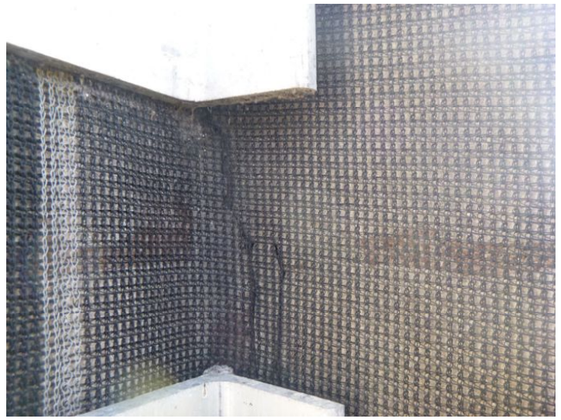
279-166 Stone_Displacement Horizontal 2018-1



279-225 TerraCotta_SurfLoss Glaze loss 2018-1

279-229 TerraCotta_Crack Single unit 2018-1

280-121 Stone_Crack System units and joints 2018-1



280-121 Stone_Crack System units and joints 2018-2

280-227 TerraCotta_Crack Crazing 2018-1

280-245 TerraCotta_Joints Mortar Caulked Failed 2018-1

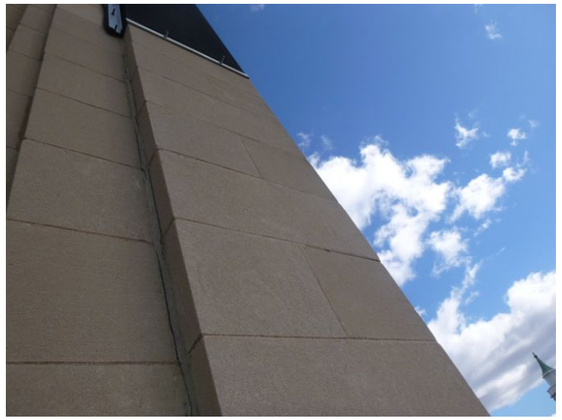
280-245 TerraCotta_Joints Mortar Caulked Failed 2018-2

280-245 TerraCotta_Joints Mortar Caulked Failed 2018-3

281-21 Stone_SoilStain Atmospheric 2018-1

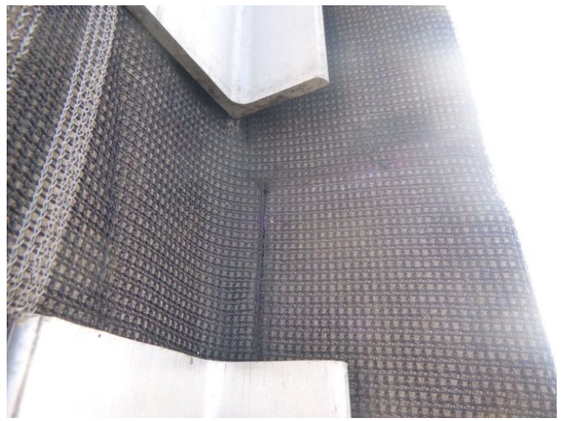
281-92 Stone_Crack System joints 2018-1

281-92 Stone_Crack System joints 2018-2



281-97 Stone_Spall Bonded 2018-1

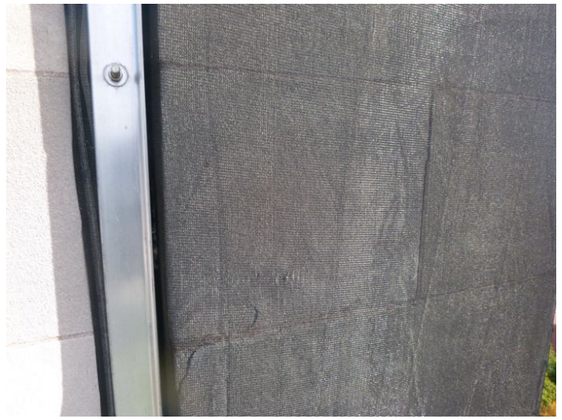
281-97 Stone_Spall Bonded 2018-2



281-112 Stone_Crack System units and joints 2018-1

281-112 Stone_Crack System units and joints 2018-2

281-134 Stone_Crack System units and joints 2018-1

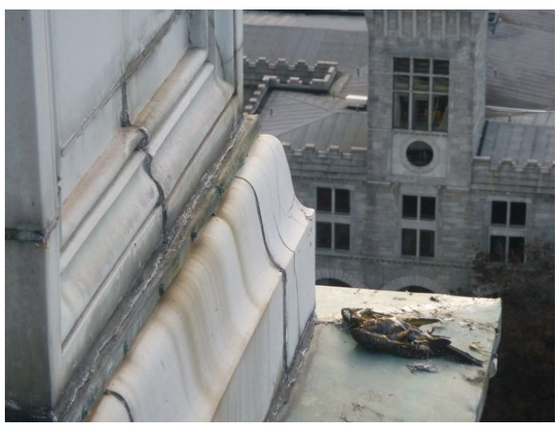


281-134 Stone_Crack System units and joints 2018-2

281-204 TerraCotta_Crack Single unit 2018-1

281-206 TerraCotta_Spall Missing 2018-1

281-206 TerraCotta_Spall Missing 2018-2

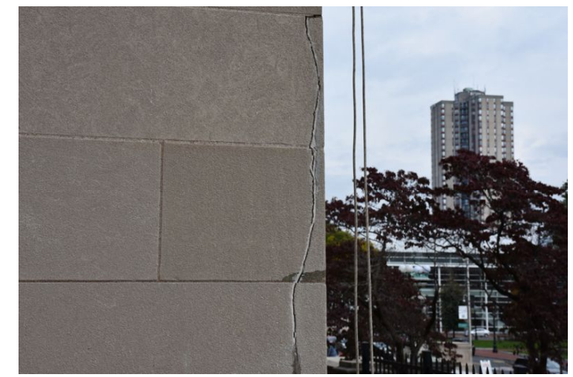


281-222 TerraCotta_Crack Crazing 2018-1

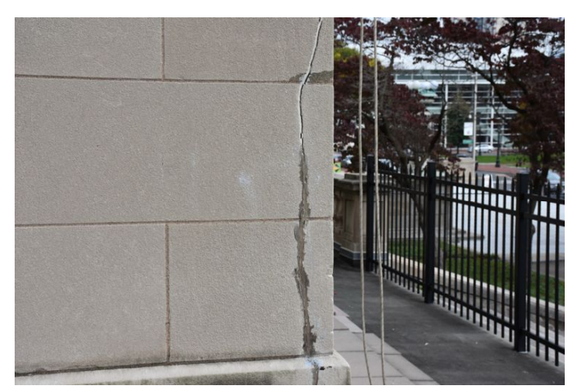
281-225 TerraCotta_Crack Single unit 2018-1

281-229 TerraCotta_Crack Single unit 2018-1

282-23 Stone_Crack System units and joints 2018-1

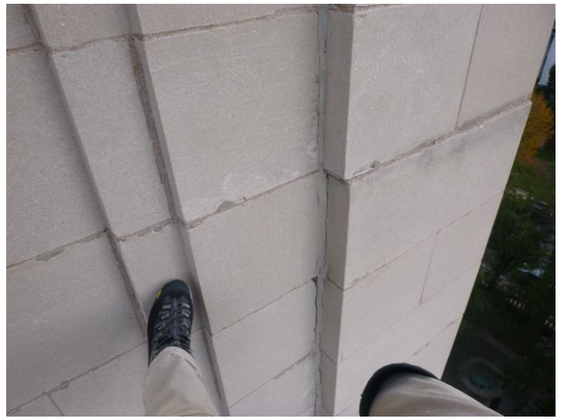


282-23 Stone_Crack System units and joints 2018-2



282-23 Stone_Crack System units and joints 2018-3

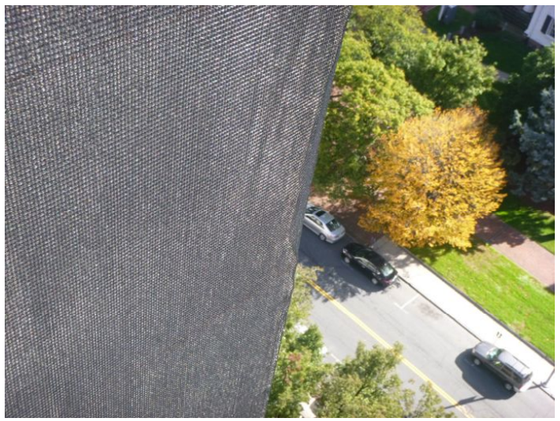
282-23 Stone_Crack System units and joints 2018-4



282-89 Stone_Displacement Horizontal 2018-1

282-89 Stone_Displacement Horizontal 2018-2

282-89 Stone_Displacement Horizontal 2018-3



282-162 Stone_Spall Missing 2018-1

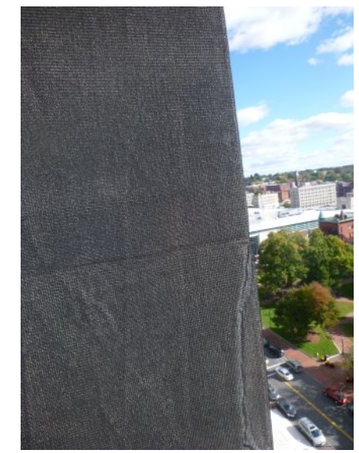
282-174 Stone_Spall Bonded 2018-1

282-224 TerraCotta_Crack Crazing 2018-1

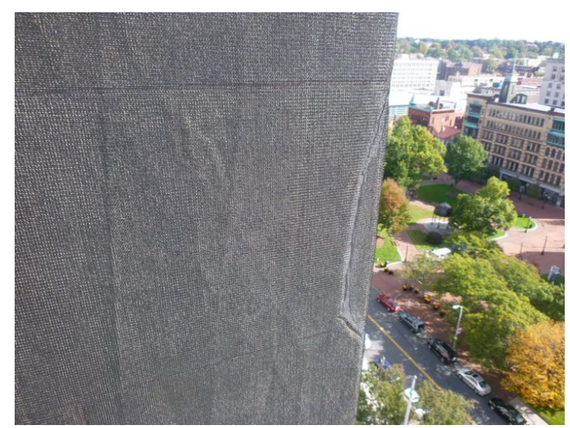
282-224 TerraCotta_Crack Crazing 2018-2

282-224 TerraCotta_Crack Crazing 2018-3

284-96 Stone_Displacement Horizontal 2018-1



284-147 Stone_Crack System units and joints 2018-1

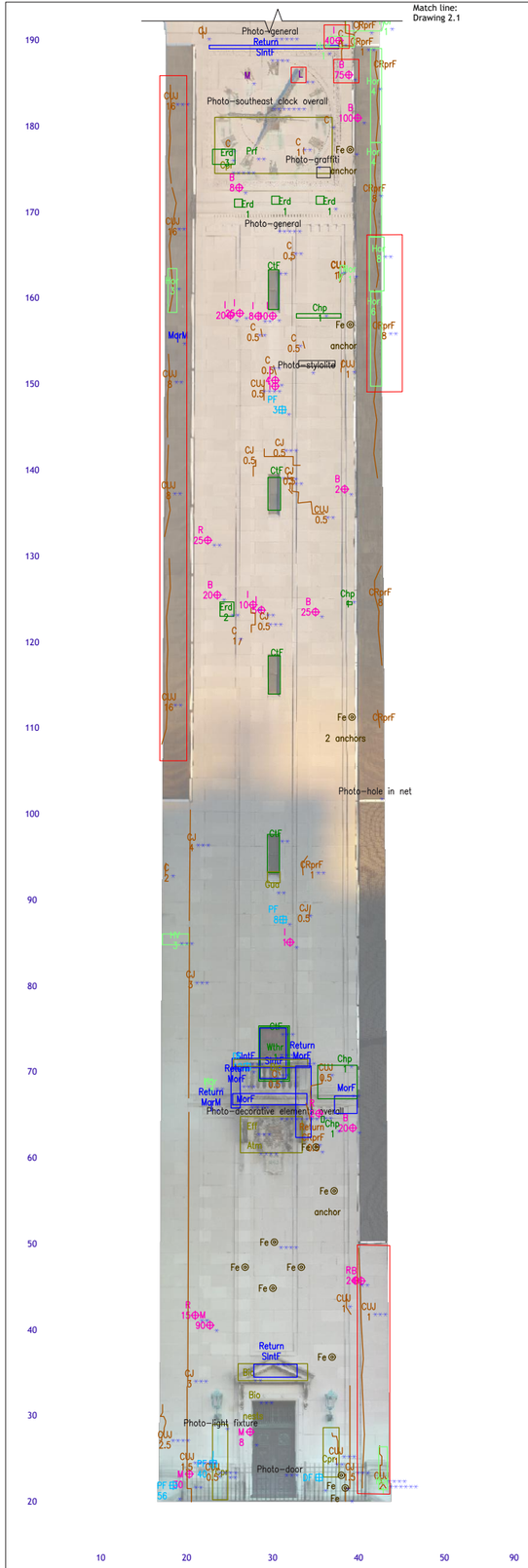


284-147 Stone_Crack System units and joints 2018-2

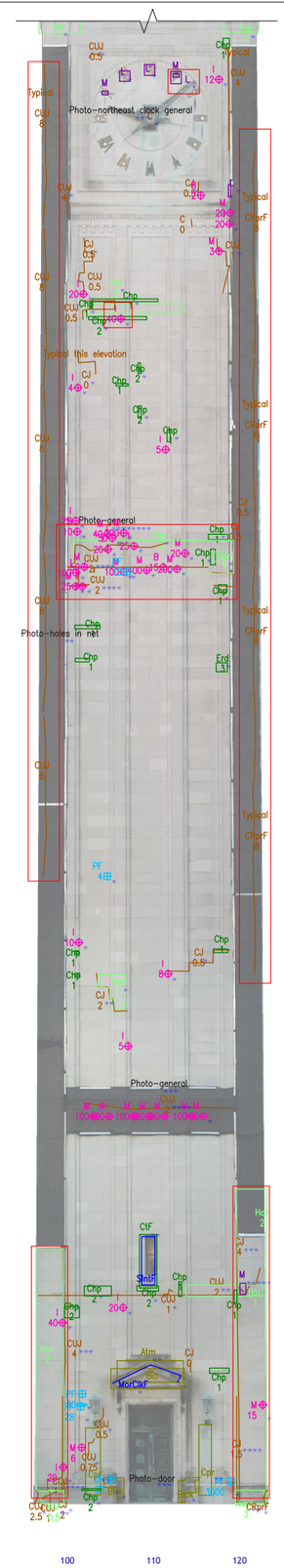
296-48 Stone_Crack System joints 2018-1

296-48 Stone_Crack System joints 2018-2

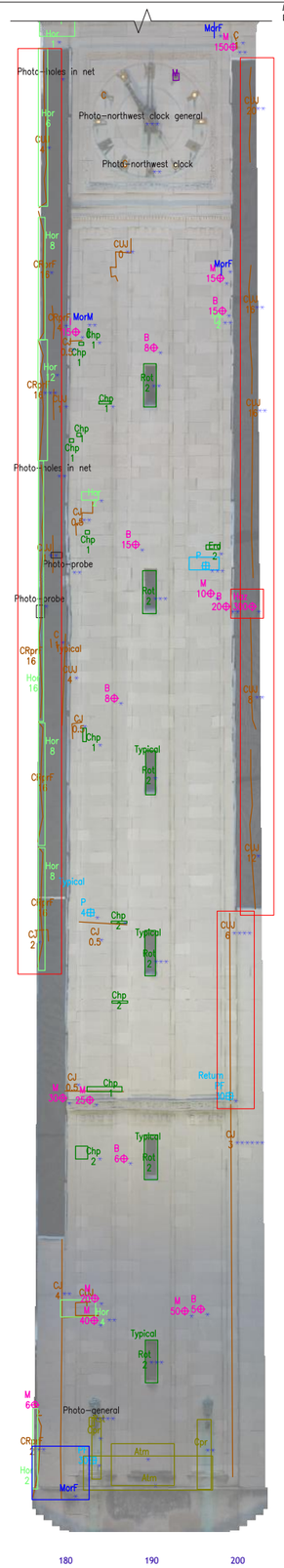
Annotated Drawings



1.1 Southeast



1.2 Northeast



1.3 Northwest

1.4 Southwest

KEY TO SYMBOLS

Each TPAS annotation is comprised of a graphical symbol and text label.
Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.
Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed:	Fault Code R; Severity 20; Target Symbol; Picture or Video Link
This box symbol indicates an area of biological soiling, which was not photographed:	Bio
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed:	CJ 3
This box symbol indicates a Priority 1 condition:	

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C	Crack	Width in 1/16" increments:	Length in lin.ft.
		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32 inch	
		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	Number of units
		HV	Horiz. & Vert. disp.	1 0 to 1/8 inch	
				2 1/8 to 1/4 inch	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk	Mortar Caulked	Not Applicable	Length in lin. ft.
		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed	Size of repair in square inches	Not applicable
		D	Dutchman sound		
		PF	Patch Failed		
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric	Not applicable	Area in sq. ft.
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper		
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls		B	Bonded	Size of spall in square inches	Not applicable
		Haz	Hazardous		
		I	Incipient		
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss in 1/8" increments:	Area in sq. ft.
		Erd	Eroded	1 0 to 1/8 inch	
		Glz	Glaze loss	2 1/8 to 1/4 inch	
Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

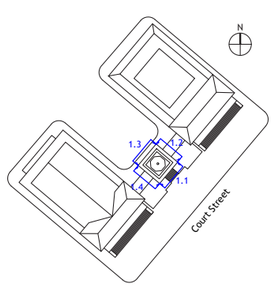
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan

SURVEYED USING tpas
SURVEY DATE: October 23-26 BY: PC, KDs, RO, MP, KS
VERTICAL access
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

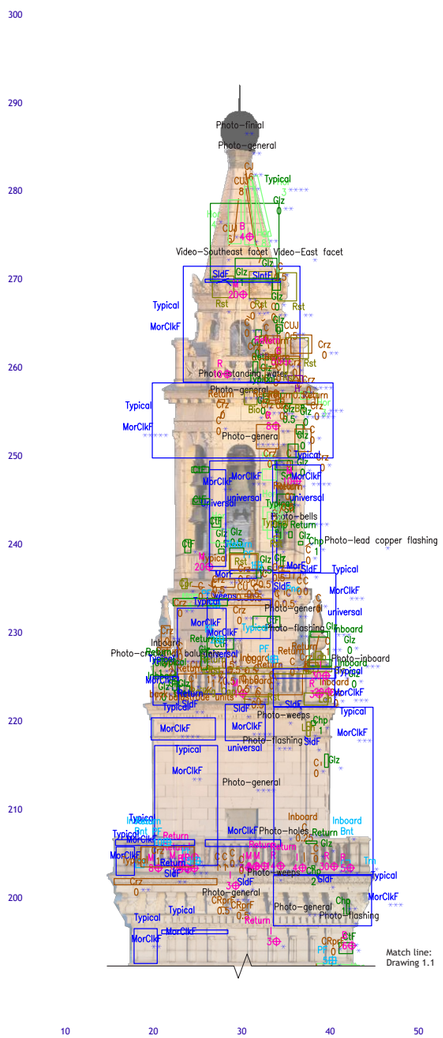
ELEVATIONS
LIMESTONE TOWER SHAFT

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

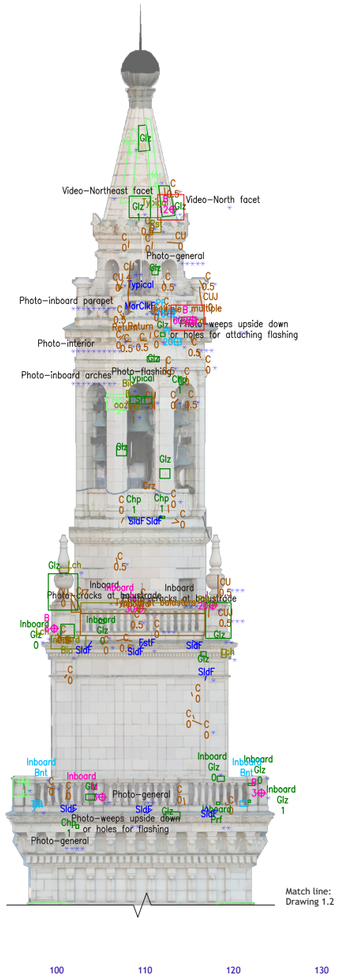
Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

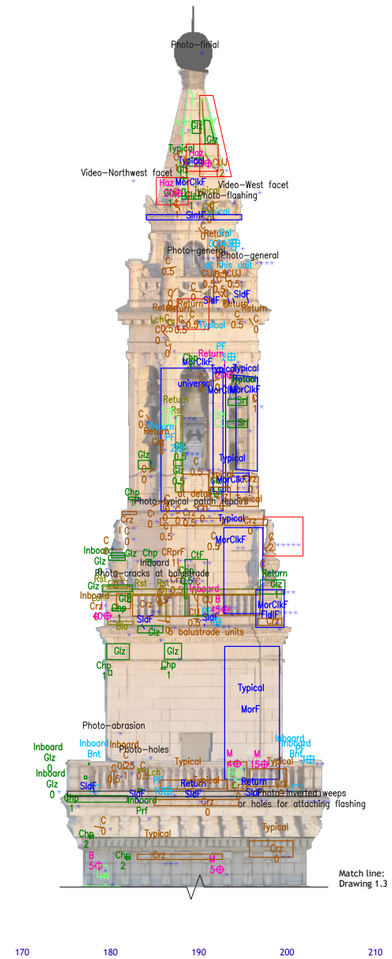
1



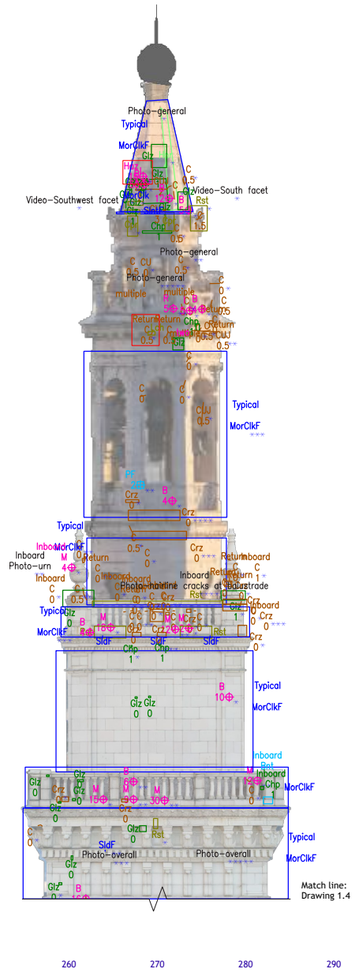
2.1 Southeast



2.2 Northeast



2.3 Northwest



2.4 Southwest

KEY TO SYMBOLS

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Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
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This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed:	CJ 3 *
This box symbol indicates a Priority 1 condition:	

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C	Crack	Width in 1/16" increments:	Length in lin.ft.
		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32 inch	
		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	Number of units
		HV	Horiz. & Vert. disp.	1 0 to 1/8 inch	
				2 1/8 to 1/4 inch	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk	Mortar Caulked	Not Applicable	Length in lin. ft.
		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed	Size of repair in square inches	Not applicable
		D	Dutchman sound		
		PF	Patch Failed		
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric	Not applicable	Area in sq. ft.
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper		
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls		B	Bonded	Size of spall in square inches	Not applicable
		Haz	Hazardous		
		I	Incipient		
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss in 1/8" increments:	Area in sq. ft.
		Erd	Eroded	1 0 to 1/8 inch	
		Glz	Glaze loss	2 1/8 to 1/4 inch	
Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

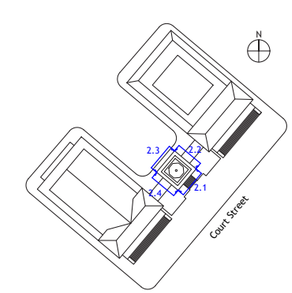
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan

SURVEYED USING tpas
SURVEY DATE: October 23-26 BY: PC, KDa, KO, MP, KS
VERTICAL access
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

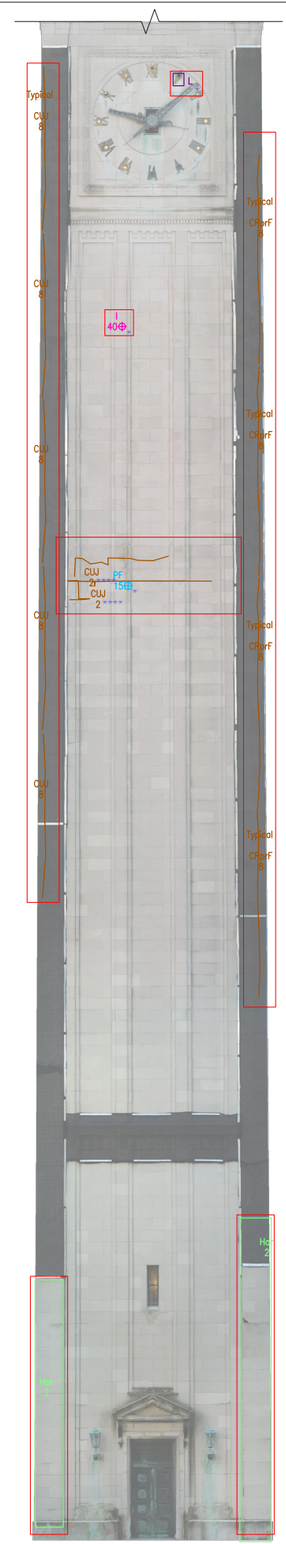
ELEVATIONS
TERRA COTTA BELFRY & OBSERVATION LEVELS

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

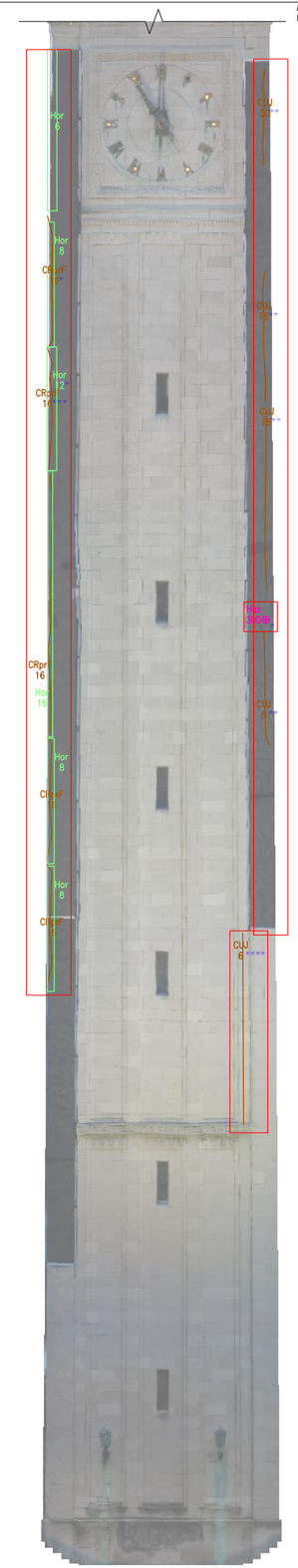
Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

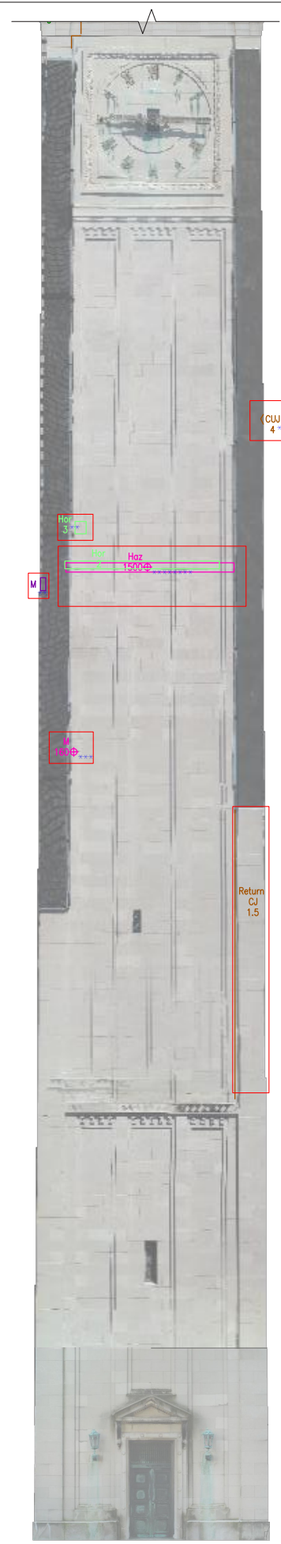
3.1 Southeast



3.2 Northeast



3.3 Northwest



3.4 Southwest

KEY TO SYMBOLS

Each TPAS annotation is comprised of a graphical symbol and text label.

Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.

Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed:

Fault Code — R; Severity — 20 ⊠ — Target Symbol; * — Picture or Video Link

This box symbol indicates an area of biological soiling, which was not photographed: Bio

This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: CJ 3 *

This box symbol indicates a Priority 1 condition:

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C CJ CU CUJ CRprF	Crack Crack system: Joints Crack system: Units Crack sys.: Units & Joints Crack Repair Failed	Width in 1/16" increments: 0 Hairline .5 Hairline to 1/32 inch 1 1/32 to 1/16 inch 2 1/16 to 1/8 inch	Length in lin.ft.
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor HV	Horizontal displacement Horiz. & Vert. disp.	Disp. in 1/8" increments 1 0 to 1/8 inch 2 1/8 to 1/4 inch	Number of units
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk MorClkF MorF MorM SlntF	Mortar Caulked Mortar Caulked Failed Mortar Failed Mortar Missing Sealant Failed	Not Applicable Percentage Percentage Not Applicable Not Applicable	Length in lin. ft. Length in lin. ft. Area in sq. ft. Length in lin. ft. Length in lin. ft.
Previous Repairs		DF D PF P Rpl	Dutchman Failed Dutchman sound Patch Failed Patch sound Replacement	Size of repair in square inches Area in square feet	Not applicable
Soiled/Stained		Atm Bio Blk Cpr Eff Gua Lch Rst	Atmospheric Biological growth Black Crusts Copper Efflorescence Guano Leached Salts Rust	Not applicable	Area in sq. ft.
Spalls	⊠	B Haz I M R	Bonded Hazardous Incipient Missing Removed	Size of spall in square inches	Not applicable
Surface Loss		Chp Erd Glz	Chipped Eroded Glaze loss	Depth of loss in 1/8" increments: 1 0 to 1/8 inch 2 1/8 to 1/4 inch	Area in sq. ft.
Unsecured		H M	Hollow Missing	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: METALS

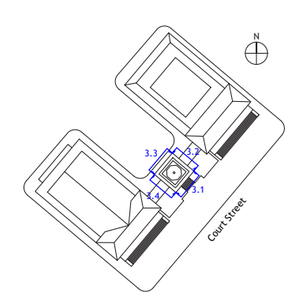
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf Prf	Surface Perforated	Not applicable	Area in sq. ft.
Damaged		Bnt Pnc Trn	Bent Punctured Torn	Not applicable	Area in sq. ft.
Seams		FstF FldF SldF SlntF	Fastener Failed Folded Seam Failed Solder Failed Sealant Failed	Not applicable	Count Length in lin. ft. Length in lin. ft. Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot Wthr	Rotten Weathered	Depth in 1/8" increments	Area in sq. ft.
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L M	Loose Missing	N/A	N/A



Key Plan

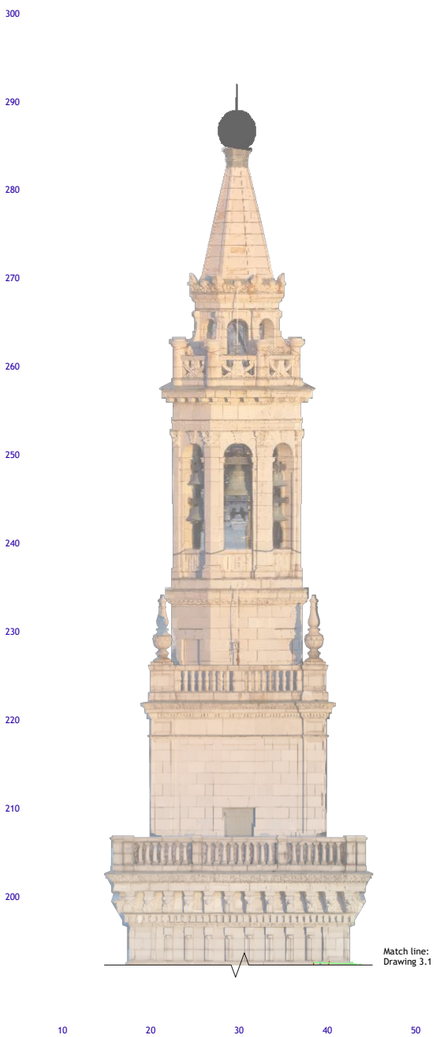
SURVEYED USING tpas VERTICAL access
SURVEY DATE: October 23-26 BY: PC, KDa, KO, MP, KS
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

ELEVATIONS
LIMESTONE TOWER SHAFT - PRIORITY 1 CONDITIONS

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

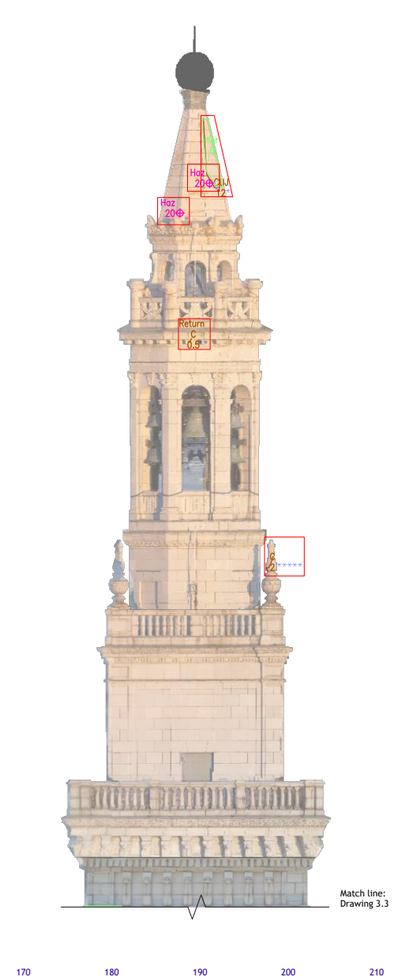
Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935



4.1 Southeast

4.2 Northeast



4.3 Northwest

4.4 Southwest

KEY TO SYMBOLS

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--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.

Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed:	Fault Code — R; Severity — 20; Target Symbol; Picture or Video Link
This box symbol indicates an area of biological soiling, which was not photographed:	Bio
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed:	CJ 3
This box symbol indicates a Priority 1 condition:	

KEY TO SURVEY CODES: MASONRY

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Cracks		C	Crack	Width in 1/16" increments:	Length in lin.ft.
		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32 inch	
		CUJ	Crack sys.: Units & Joints	1 1/32 to 1/16 inch	
		CRprF	Crack Repair Failed	2 1/16 to 1/8 inch	
		Crz	Crazing	Not applicable	Area in sq. ft.
Displacement		Hor	Horizontal displacement	Disp. in 1/8" increments	Number of units
		HV	Hortz. & Vert. disp.	1 0 to 1/8 inch	
				2 1/8 to 1/4 inch	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints		MorClk	Mortar Caulked	Not Applicable	Length in lin. ft.
		MorClkF	Mortar Caulked Failed	Percentage	Length in lin. ft.
		MorF	Mortar Failed	Percentage	Area in sq. ft.
		MorM	Mortar Missing	Not Applicable	Length in lin. ft.
		SlntF	Sealant Failed	Not Applicable	Length in lin. ft.
Previous Repairs		DF	Dutchman Failed	Size of repair in square inches	Not applicable
		D	Dutchman sound		
		PF	Patch Failed		
		P	Patch sound		
		Rpl	Replacement	Area in square feet	
Soiled/Stained		Atm	Atmospheric	Not applicable	Area in sq. ft.
		Bio	Biological growth		
		Blk	Black Crusts		
		Cpr	Copper		
		Eff	Efflorescence		
		Gua	Guano		
		Lch	Leached Salts		
		Rst	Rust		
Spalls		B	Bonded	Size of spall in square inches	Not applicable
		Haz	Hazardous		
		I	Incipient		
		M	Missing		
		R	Removed		
Surface Loss		Chp	Chipped	Depth of loss in 1/8" increments:	Area in sq. ft.
		Erd	Eroded	1 0 to 1/8 inch	
		Glz	Glaze loss	2 1/8 to 1/4 inch	
Unsecured		H	Hollow	Not applicable	Area in sq. ft.
		M	Missing		

KEY TO SURVEY CODES: METALS

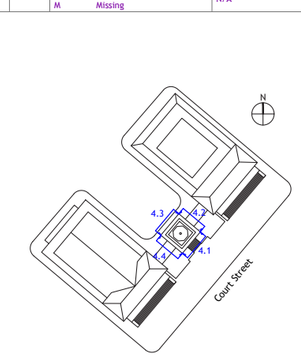
Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Damaged		Bnt	Bent	Not applicable	Area in sq. ft.
		Pnc	Punctured		
		Trn	Torn		
Seams		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.

KEY TO SURVEY CODES: WOOD

Condition	Symbol	Fault Type		Severity	Amount
Coating		CtF	Coating Failed	Not applicable	Area in sq. ft.
Deteriorated		Rot	Rotten	Depth in 1/8" increments	Area in sq. ft.
		Wthr	Weathered		
Joints		SlntF	Sealant Failed	Not applicable	Length in lin. ft.

KEY TO SURVEY CODES: GLASS

Condition	Symbol	Fault Type		Severity	Amount
Crack		C	Crack	N/A	N/A
Unsecured		L	Loose	N/A	N/A
		M	Missing		



Key Plan

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SURVEY DATE: October 23-26 BY: PC, KDs, KO, MP, KS
PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com
ISSUE DATE: November 16, 2018

ELEVATIONS
TERRA COTTA BELFRY & OBSERVATION LEVELS - PRIORITY 1 CONDITIONS

DRAWING BACKGROUNDS PREPARED BY: Vertical Access SCALE: Approximately 1/8" = 1'-0" when printed at 24" x 36"

Springfield Campanile
Exterior Investigation
36 Court Street
Springfield, MA

VA PROJECT NUMBER: 16-1935

Spreadsheet of Survey Conditions

Key to Condition Survey Codes

Block	Condition	Code	Severity	Amount
ArchMetal_Coating	Coating Failed	CtF	N/A	Area in square feet
ArchMetal_Corrosion	Perforated	Prf	N/A	Area in square feet
ArchMetal_Corrosion	Surface	Srf	N/A	Area in square feet
ArchMetal_Damaged	Bent	Bnt	N/A	Area in square feet
ArchMetal_Unsecured	Loose	L	N/A	Area in square feet
Glass_Crack	Cracked Pane	C	N/A	N/A
Glass_Unsecured	Loose	L	N/A	N/A
Glass_Unsecured	Missing	M	N/A	N/A
SheetMetal_Coating	Coating Failed	CtF	N/A	Area in square feet
SheetMetal_Damaged	Punctured	Pnc	N/A	Diameter in inches
SheetMetal_Damaged	Torn	Trn	N/A	Length in linear feet
SheetMetal_Seam	Sealant Failed	SlntF	N/A	Length in linear feet
SheetMetal_Seam	Fastener Failed	FstF	N/A	Count
SheetMetal_Seam	Solder Failed	SldF	N/A	Length in linear feet
Stone_Crack	Single Unit	C	Width in 1/16" increments	Length in linear feet
Stone_Crack	Repair Failed	CRprF	Width in 1/16" increments	Length in linear feet
Stone_Crack	System Joints	CJ	Width in 1/16" increments	Length in linear feet
Stone_Crack	System Units	CU	Width in 1/16" increments	Length in linear feet
Stone_Crack	System Units and Joints	CUJ	Width in 1/16" increments	Length in linear feet
Stone_Displacement	Horizontal and Vertical	HV	1/8" increments	Number of units
Stone_Displacement	Horizontal	Hor	1/8" increments	Number of units
Stone_Embedment	Ferrous Element	Fe	N/A	N/A
Stone_Joints	Mortar Caulked Failed	MorClkF	N/A	Percentage
Stone_Joints	Mortar Failed	MorF	N/A	Percentage
Stone_Joints	Mortar Missing	MorM	N/A	Length in linear feet
Stone_Joints	Sealant Failed	SlntF	N/A	Length in linear feet
Stone_Repair	Dutchman Failed	DF	N/A	Size in square inches
Stone_Repair	Dutchman Sound	D	N/A	Size in square inches
Stone_Repair	Patch Failed	PF	N/A	Size in square inches
Stone_Repair	Patch Sound	P	N/A	Size in square inches
Stone_SoilStain	Atmospheric	Atm	N/A	Area in square feet
Stone_SoilStain	Biological	Bio	N/A	Area in square feet
Stone_SoilStain	Black Crusts	Blck	N/A	Area in square feet
Stone_SoilStain	Copper	Cpr	N/A	Area in square feet
Stone_SoilStain	Efflorescence	Eff	N/A	Area in square feet
Stone_SoilStain	Guano	Gua	N/A	Area in square feet
Stone_SoilStain	Rust	Rst	N/A	Area in square feet
Stone_Spall	Bonded	B	Size in square inches	N/A
Stone_Spall	Hazardous	Haz	Size in square inches	N/A
Stone_Spall	Incipient	I	Size in square inches	N/A
Stone_Spall	Missing	M	Size in square inches	N/A
Stone_Spall	Removed	R	Size in square inches	N/A
Stone_SurfLoss	Chipped	Chp	Depth in 1/8" increments	Area in square feet
Stone_Unsecured	Missing	M	N/A	Area in square feet
TerraCotta_Coating	Coating Failed	CtF	N/A	Area in square feet
TerraCotta_Crack	Single Unit	C	Width in 1/16" increments	Length in linear feet
TerraCotta_Crack	Repair Failed	CRprF	Width in 1/16" increments	Length in linear feet

Key to Condition Survey Codes

Block	Condition	Code	Severity	Amount
TerraCotta_Crack	Crazing	Crz	N/A	Area in square feet
TerraCotta_Crack	System Joints	CJ	Width in 1/16" increments	Length in linear feet
TerraCotta_Crack	System Units	CU	Width in 1/16" increments	Length in linear feet
TerraCotta_Crack	System Units and Joints	CUJ	Width in 1/16" increments	Length in linear feet
TerraCotta_Displacement	Horizontal and Vertical	HV	1/8" increments	Number of units
TerraCotta_Displacement	Horizontal	Hor	1/8" increments	Number of units
TerraCotta_Joints	Mortar Caulked	MorClk	N/A	N/A
TerraCotta_Joints	Mortar Caulked Failed	MorClkF	N/A	Percentage
TerraCotta_Joints	Mortar Failed	MorF	N/A	Percentage
TerraCotta_Joints	Sealant Failed	SlntF	N/A	Length in linear feet
TerraCotta_Repair	Patch Failed	PF	N/A	Size in square inches
TerraCotta_Repair	Replacement	Rpl	N/A	Size in square inches
TerraCotta_SoilStain	Biological	Bio	N/A	Area in square feet
TerraCotta_SoilStain	Copper	Cpr	N/A	Area in square feet
TerraCotta_SoilStain	Leached Salts	Lch	N/A	Area in square feet
TerraCotta_SoilStain	Rust	Rst	N/A	Area in square feet
TerraCotta_Spall	Bonded	B	Size in square inches	N/A
TerraCotta_Spall	Hazardous	Haz	Size in square inches	N/A
TerraCotta_Spall	Incipient	I	Size in square inches	N/A
TerraCotta_Spall	Missing	M	Size in square inches	N/A
TerraCotta_Spall	Removed	R	Size in square inches	N/A
TerraCotta_SurfLoss	Chipped	Chp	Depth in 1/8" increments	Area in square feet
TerraCotta_SurfLoss	Glaze Loss	Glz	Depth in 1/8" increments	Area in square feet
TerraCotta_Unsecured	Hollow	H	N/A	Area in square feet
Wood_Coating	Coating Failed	CtF	N/A	Area in square feet
Wood_Deteriorated	Rotten	Rot	N/A	Area in square feet
Wood_Deteriorated	Weathered	Wthr	N/A	Area in square feet
Wood_Joints	Sealant Failed	SlntF	N/A	Length in linear feet

Summary of Condition Quantities

Block	Condition	Code	Total Locations	Total Quantity/Amount	
ArchMetal_Coating	Coating Failed	CtF	2	2.4	Area in square feet
ArchMetal_Corrosion	Perforated	Prf	3	0.7	Area in square feet
ArchMetal_Corrosion	Surface	Srf	5	9.5	Area in square feet
ArchMetal_Damaged	Bent	Bnt	7	5.1	Area in square feet
ArchMetal_Unsecured	Loose	L	4	5.2	Area in square feet
Glass_Unsecured	Loose	L	1	1.0	Location
Glass_Unsecured	Missing	M	4	4.0	Location
SheetMetal_Coating	Coating Failed	CtF	1	16.3	Area in square feet
SheetMetal_Damaged	Punctured	Pnc	1	1.0	Diameter in inches
SheetMetal_Damaged	Torn	Trn	2	1.4	Length in linear feet
SheetMetal_Seam	Sealant Failed	SlntF	1	17.7	Length in linear feet
SheetMetal_Seam	Fastener Failed	FstF	1	1.0	Count
SheetMetal_Seam	Solder Failed	SldF	31	23.8	Length in linear feet
Stone_Crack	Single Unit	C	24	73.1	Length in linear feet
Stone_Crack	Repair Failed	CRprF	21	277.2	Length in linear feet
Stone_Crack	System Joints	CJ	35	382.6	Length in linear feet
Stone_Crack	System Units	CU	2	2.3	Length in linear feet
Stone_Crack	System Units and Joints	CUJ	67	626.8	Length in linear feet
Stone_Displacement	Horizontal and Vertical	HV	1	0.0	Number of units
Stone_Displacement	Horizontal	Hor	44	234.0	Number of units
Stone_Embedment	Ferrous Element	Fe	12	12.0	Count
Stone_Joints	Mortar Caulked Failed	MorClkF	1	9.5	Length in linear feet
Stone_Joints	Mortar Failed	MorF	7	77.4	Length in linear feet
Stone_Joints	Mortar Missing	MorM	4	3.8	Length in linear feet
Stone_Joints	Sealant Failed	SlntF	3	64.3	Length in linear feet
Stone_Repair	Dutchman Failed	DF	3	39.0	Size in square inches
Stone_Repair	Dutchman Sound	D	2	61.0	Size in square inches
Stone_Repair	Patch Failed	PF	14	3340.0	Size in square inches
Stone_Repair	Patch Sound	P	2	4.0	Size in square inches
Stone_SoilStain	Atmospheric	Atm	6	151.5	Area in square feet
Stone_SoilStain	Biological	Bio	4	42.8	Area in square feet
Stone_SoilStain	Black Crusts	Blck	3	15.7	Area in square feet
Stone_SoilStain	Copper	Cpr	10	496.7	Area in square feet
Stone_SoilStain	Efflorescence	Eff	1	20.0	Area in square feet
Stone_SoilStain	Guano	Gua	1	1.9	Area in square feet
Stone_SoilStain	Rust	Rst	1	0.6	Area in square feet
Stone_Spall	Bonded	B	85	1306.0	Size in square inches
Stone_Spall	Hazardous	Haz	2	1800.0	Size in square inches
Stone_Spall	Incipient	I	63	1146.0	Size in square inches
Stone_Spall	Missing	M	72	3382.0	Size in square inches
Stone_Spall	Removed	R	5	69.0	Size in square inches
Stone_SurfLoss	Chipped	Chp	60	50.2	Area in square feet
Stone_Unsecured	Missing	M	2	1.7	Area in square feet
TerraCotta_Coating	Coating Failed	CtF	5	11.5	Area in square feet
TerraCotta_Crack	Single Unit	C	170	316.7	Length in linear feet
TerraCotta_Crack	Repair Failed	CRprF	4	3.6	Length in linear feet
TerraCotta_Crack	Crazing	Crz	53	191.3	Area in square feet
TerraCotta_Crack	System Joints	CJ	1	2.0	Length in linear feet
TerraCotta_Crack	System Units	CU	14	78.0	Length in linear feet
TerraCotta_Crack	System Units and Joints	CUJ	14	79.4	Length in linear feet
TerraCotta_Displacement	Horizontal and Vertical	HV	2	3.0	Number of units
TerraCotta_Displacement	Horizontal	Hor	18	56.0	Number of units

Summary of Condition Quantities

Block	Condition	Code	Total Locations	Total Quantity/Amount	
TerraCotta_Joints	Mortar Caulked	MorClk	1	8.7	Length in linear feet
TerraCotta_Joints	Mortar Caulked Failed	MorClkF	35	1153.9	Length in linear feet
TerraCotta_Joints	Mortar Failed	MorF	3	113.4	Length in linear feet
TerraCotta_Joints	Sealant Failed	SlntF	2	17.3	Length in linear feet
TerraCotta_Repair	Patch Failed	PF	15	91.0	Size in square inches
TerraCotta_Repair	Replacement	Rpl	1	0.6	Size in square inches
TerraCotta_SoilStain	Biological	Bio	6	12.1	Area in square feet
TerraCotta_SoilStain	Copper	Cpr	3	5.5	Area in square feet
TerraCotta_SoilStain	Leached Salts	Lch	10	16.2	Area in square feet
TerraCotta_SoilStain	Rust	Rst	22	113.0	Area in square feet
TerraCotta_Spall	Bonded	B	19	881.0	Size in square inches
TerraCotta_Spall	Hazardous	Haz	3	55.0	Size in square inches
TerraCotta_Spall	Incipient	I	12	223.0	Size in square inches
TerraCotta_Spall	Missing	M	20	215.0	Size in square inches
TerraCotta_Spall	Removed	R	8	115.0	Size in square inches
TerraCotta_SurfLoss	Chipped	Chp	24	6.0	Area in square feet
TerraCotta_SurfLoss	Glaze Loss	Glz	87	208.6	Area in square feet
TerraCotta_Unsecured	Hollow	H	1	1.4	Area in square feet
Wood_Coating	Coating Failed	CtF	6	58.5	Area in square feet
Wood_Deteriorated	Rotten	Rot	6	42.7	Area in square feet
Wood_Deteriorated	Weathered	Wthr	1	19.8	Area in square feet
Wood_Joints	Sealant Failed	SlntF	2	32.1	Length in linear feet

Priority 1 Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Photos
ArchMetal_Unsecured	Loose	114	185	L	1.7	sq. ft.			Pr1	Yes
Glass_Unsecured	Loose	33	186	L					Pr1	Yes
Stone_Crack	Repair failed	122	97	CRprF	23.7	feet	8	1/16 in.	Pr1	No
Stone_Crack	Repair failed	122	121	CRprF	23.7	feet	8	1/16 in.	Pr1	No
Stone_Crack	Repair failed	122	145	CRprF	23.7	feet	8	1/16 in.	Pr1	No
Stone_Crack	Repair failed	122	169	CRprF	23.7	feet	8	1/16 in.	Pr1	No
Stone_Crack	Repair failed	176	119	CRprF	29.4	feet	16	1/16 in.	Pr1	No
Stone_Crack	Repair failed	177	150	CRprF	14.0	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	Repair failed	177	90	CRprF	14.1	feet	16	1/16 in.	Pr1	No
Stone_Crack	Repair failed	177	104	CRprF	14.1	feet	16	1/16 in.	Pr1	No
Stone_Crack	Repair failed	178	164	CRprF	15.2	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	System joints	281	92	CJ	36.8	feet	1.5	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	18	138	CUJ	10.7	feet	8	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	18	113	CUJ	21.7	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	18	151	CUJ	9.7	feet	8	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	18	183	CUJ	11.5	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	18	169	CUJ	14.7	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	41	42	CUJ	28.0	feet	1	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	97	105	CUJ	18.6	feet	8	1/16 in.	Pr1	No
Stone_Crack	System units and joints	97	125	CUJ	18.6	feet	8	1/16 in.	Pr1	No
Stone_Crack	System units and joints	97	143	CUJ	18.6	feet	8	1/16 in.	Pr1	No
Stone_Crack	System units and joints	97	162	CUJ	18.6	feet	8	1/16 in.	Pr1	No
Stone_Crack	System units and joints	97	181	CUJ	18.6	feet	8	1/16 in.	Pr1	No
Stone_Crack	System units and joints	103	129	CUJ	13.9	feet	2	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	103	127	CUJ	24.2	feet	2	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	199	87	CUJ	21.8	feet	6	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	201	114	CUJ	13.0	feet	8	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	201	160	CUJ	15.0	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	202	183	CUJ	11.0	feet	20	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	202	96	CUJ	18.6	feet	12	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	202	148	CUJ	20.6	feet	16	1/16 in.	Pr1	Yes
Stone_Crack	System units and joints	284	147	CUJ	9.9	feet	4	1/16 in.	Pr1	Yes

Priority 1 Conditions

Stone_Displacement	Horizontal	18	162	Hor		units	3	1/8 in.	Pr1	Yes
Stone_Displacement	Horizontal	42	159	Hor		units	6	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	42	165	Hor	9.0	units	8	1/8 in.	Pr1	Yes
Stone_Displacement	Horizontal	98	38	Hor	30.0	units	2	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	123	54	Hor	40.0	units	2	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	176	116	Hor	10.0	units	16	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	178	181	Hor	11.0	units	6	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	178	152	Hor	10.0	units	12	1/8 in.	Pr1	Yes
Stone_Displacement	Horizontal	178	94	Hor	10.0	units	8	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	178	108	Hor	10.0	units	8	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	178	167	Hor	10.0	units	8	1/8 in.	Pr1	No
Stone_Displacement	Horizontal	260	135	Hor	1.0	units	3	1/8 in.	Pr1	Yes
Stone_Displacement	Horizontal	264	132	Hor	9.0	units	2	1/8 in.	Pr1	No
Stone_Repair	Patch Failed	107	128	PF	15	sq. in.			Pr1	Yes
Stone_Spall	Bonded	39	186	B			75	sq. in.	Pr1	Yes
Stone_Spall	Hazardous	202	124	Haz			300	sq. in.	Pr1	Yes
Stone_Spall	Hazardous	269	130	Haz			1500	sq. in.	Pr1	Yes
Stone_Spall	Incipient	38	190	I			40	sq. in.	Pr1	Yes
Stone_Spall	Incipient	105	132	I			50	sq. in.	Pr1	Yes
Stone_Spall	Incipient	106	158	I			40	sq. in.	Pr1	Yes
Stone_Spall	Missing	261	109	M			160	sq. in.	Pr1	Yes
Stone_Unsecured	Missing	256	128	M	0.9	sq. ft.			Pr1	Yes
TerraCotta_Crack	Single unit	189	257	C	0.5	feet	0.5	1/16 in.	Pr1	Yes
TerraCotta_Crack	Single unit	198	232	C	2.1	feet	2	1/16 in.	Pr1	Yes
TerraCotta_Crack	Single unit	269	256	C	1.0	feet	0.5	1/16 in.	Pr1	Yes
TerraCotta_Crack	System units and joints	192	274	CUJ	8.1	feet	12	1/16 in.	Pr1	Yes
TerraCotta_Displacement	Horizontal	191	279	Hor	7	units	6	1/8 in.	Pr1	No
TerraCotta_Spall	Bonded	113	271	B			12	sq. in.	Pr1	Yes
TerraCotta_Spall	Bonded	115	258	B			600	sq. in.	Pr1	Yes
TerraCotta_Spall	Hazardous	188	271	Haz			20	sq. in.	Pr1	Yes
TerraCotta_Spall	Hazardous	191	274	Haz			20	sq. in.	Pr1	Yes
TerraCotta_Spall	Hazardous	268	274	Haz			15	sq. in.	Pr1	Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
ArchMetal_Coating	Coating Failed	25	248	CtF	1.2	sq. ft.			Pr2		Yes
ArchMetal_Coating	Coating Failed	25	245	CtF	1.2	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Perforated	28	177	Prf	0.5	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Perforated	118	202	Prf	0.1	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Perforated	184	201	Prf	0.1	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Surface	35	247	Srf	2.1	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Surface	35	244	Srf	2.3	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Surface	110	249	Srf	1.9	sq. ft.			Pr2		Yes
ArchMetal_Corrosion	Surface	195	247	Srf	1.5	sq. ft.			Pr2		No
ArchMetal_Corrosion	Surface	195	244	Srf	1.6	sq. ft.			Pr2		Yes
ArchMetal_Damaged	Bent	19	207	Bnt	0.8	sq. ft.			Pr3		No
ArchMetal_Damaged	Bent	42	207	Bnt	0.8	sq. ft.			Pr3		Yes
ArchMetal_Damaged	Bent	98	207	Bnt	0.5	sq. ft.			Pr3		Yes
ArchMetal_Damaged	Bent	122	207	Bnt	0.5	sq. ft.			Pr3		No
ArchMetal_Damaged	Bent	178	207	Bnt	0.8	sq. ft.			Pr2		No
ArchMetal_Damaged	Bent	201	207	Bnt	0.8	sq. ft.			Pr2		No
ArchMetal_Damaged	Bent	282	207	Bnt	0.8	sq. ft.			Pr2		No
ArchMetal_Unsecured	Loose	106	186	L	1.5	sq. ft.			Pr2		Yes
ArchMetal_Unsecured	Loose	109	186	L	1.5	sq. ft.			Pr2		Yes
ArchMetal_Unsecured	Loose	114	185	L	1.7	sq. ft.			Pr1		Yes
ArchMetal_Unsecured	Loose	119	173	L	0.5	sq. ft.			Pr2		Yes
Glass_Crack	Cracked pane	25	178	C					Pr2		Yes
Glass_Crack	Cracked pane	36	180	C					Pr2		Yes
Glass_Crack	Cracked pane	110	181	C					Pr2		Yes
Glass_Crack	Cracked pane	184	183	C					Pr2		No
Glass_Crack	Cracked pane	187	175	C					Pr2		No
Glass_Unsecured	Loose	33	186	L					Pr1		Yes
Glass_Unsecured	Missing	27	186	M					Pr2		Yes
Glass_Unsecured	Missing	104	185	M					Pr2		No
Glass_Unsecured	Missing	113	187	M					Pr2		No
Glass_Unsecured	Missing	193	186	M					Pr2		No
SheetMetal_Coating	Coating Failed	190	229	CtF	16.3	sq. ft.			Pr2		Yes
SheetMetal_Damaged	Punctured	36	235	Pnc	1.0	sq. ft.			Pr2		Yes
SheetMetal_Damaged	Torn	44	204	Trn	0.2	sq. ft.			Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
SheetMetal_Damaged	Torn	98	203	Trn	1.2	sq. ft.			Pr2		Yes
SheetMetal_Seam	Fastener Failed	110	222	FstF	1.0	count			Pr2		Yes
SheetMetal_Seam	Folded Failed	198	223	FldlF	0.4	feet			Pr2		Yes
SheetMetal_Seam	Sealant Failed	32	270	SlntF	17.7	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	22	202	SldF	1.0	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	24	222	SldF	0.7	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	28	270	SldF	3.4	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	30	221	SldF	0.2	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	30	201	SldF	0.3	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	35	235	SldF	1.0	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	36	222	SldF	0.8	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	38	237	SldF	0.4	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	38	217	SldF	0.9	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	40	202	SldF	0.6	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	101	203	SldF	0.7	feet			Pr2		No
SheetMetal_Seam	Solder Failed	103	221	SldF	0.9	feet			Pr2		No
SheetMetal_Seam	Solder Failed	109	221	SldF	0.9	feet			Pr2		No
SheetMetal_Seam	Solder Failed	109	235	SldF	0.7	feet			Pr2		No
SheetMetal_Seam	Solder Failed	110	203	SldF	0.7	feet			Pr2		No
SheetMetal_Seam	Solder Failed	111	235	SldF	0.7	feet			Pr2		No
SheetMetal_Seam	Solder Failed	116	221	SldF	1.0	feet			Pr2		No
SheetMetal_Seam	Solder Failed	117	218	SldF	0.5	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	117	202	SldF	0.7	feet			Pr2		No
SheetMetal_Seam	Solder Failed	178	203	SldF	0.5	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	183	202	SldF	0.8	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	184	222	SldF	0.6	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	189	202	SldF	0.7	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	191	222	SldF	0.2	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	191	258	SldF	0.7	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	195	259	SldF	0.6	feet			Pr2		No
SheetMetal_Seam	Solder Failed	196	203	SldF	0.5	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	264	221	SldF	1.0	feet			Pr2		No
SheetMetal_Seam	Solder Failed	264	198	SldF	0.3	feet			Pr2		Yes
SheetMetal_Seam	Solder Failed	270	221	SldF	1.0	feet			Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
SheetMetal_Seam	Solder Failed	276	221	SldF	1.0	feet			Pr2		No
Stone_Crack	Repair failed	35	94	CRprF	2.4	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	35	62	CRprF	2.4	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	40	189	CRprF	7.1	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	41	191	CRprF	2.1	feet		1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	42	172	CRprF	15.5	feet	8	1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	43	125	CRprF	11.8	feet	8	1/16 in.	Pr2		No
Stone_Crack	Repair failed	43	156	CRprF	22.0	feet	8	1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	43	111	CRprF	2.1	feet		1/16 in.	Pr2		No
Stone_Crack	Repair failed	43	187	CRprF	12.2	feet		1/16 in.	Pr2		No
Stone_Crack	Repair failed	122	97	CRprF	23.7	feet	8	1/16 in.	Pr1		No
Stone_Crack	Repair failed	122	121	CRprF	23.7	feet	8	1/16 in.	Pr1		No
Stone_Crack	Repair failed	122	145	CRprF	23.7	feet	8	1/16 in.	Pr1		No
Stone_Crack	Repair failed	122	169	CRprF	23.7	feet	8	1/16 in.	Pr1		No
Stone_Crack	Repair failed	122	21	CRprF	1.7	feet		1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	176	119	CRprF	29.4	feet	16	1/16 in.	Pr1		No
Stone_Crack	Repair failed	176	27	CRprF	12.5	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	Repair failed	177	150	CRprF	14.0	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	Repair failed	177	90	CRprF	14.1	feet	16	1/16 in.	Pr1		No
Stone_Crack	Repair failed	177	104	CRprF	14.1	feet	16	1/16 in.	Pr1		No
Stone_Crack	Repair failed	178	164	CRprF	15.2	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	Repair failed	179	157	CRprF	3.9	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	18	93	C	1.4	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	26	121	C	0.8	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	28	156	C	0.9	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	29	152	C	1.1	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	30	69	C	0.4	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	32	166	C	0.4	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	32	139	C	0.6	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	32	155	C	0.8	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	33	178	C	0.8	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	38	190	C	0.8	feet	0	1/16 in.	Pr2		No
Stone_Crack	Single unit	113	169	C	0.8	feet	0	1/16 in.	Pr2		No
Stone_Crack	Single unit	179	121	C	1.0	feet	1	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Crack	Single unit	200	190	C	0.8	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	263	89	C	0.5	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	264	120	C	1.8	feet	0	1/16 in.	Pr2		No
Stone_Crack	Single unit	265	126	C	1.3	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	272	76	C	1.0	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	273	133	C	0.8	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	274	80	C	1.5	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	274	161	C	2.8	feet	0.25	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	274	87	C	9.8	feet	0	1/16 in.	Pr2		No
Stone_Crack	Single unit	274	85	C	0.3	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	277	132	C	40.2	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	Single unit	278	163	C	2.8	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	System joints	20	35	CJ	31.7	feet	3	1/16 in.	Pr2		Yes
Stone_Crack	System joints	20	81	CJ	13.4	feet	3	1/16 in.	Pr2		Yes
Stone_Crack	System joints	21	97	CJ	12.9	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System joints	22	191	CJ	1.4	feet		1/16 in.	Pr2		Yes
Stone_Crack	System joints	27	142	CJ	2.2	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System joints	29	123	CJ	3.8	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	31	143	CJ	6.1	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	32	140	CJ	2.6	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	34	89	CJ	1.4	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	39	25	CJ	14.0	feet	1.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	100	21	CJ	2.8	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System joints	102	151	CJ	4.7	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	System joints	102	166	CJ	5.8	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	104	79	CJ	7.5	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System joints	114	37	CJ	1.2	feet	0	1/16 in.	Pr2		No
Stone_Crack	System joints	114	173	CJ	1.3	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	115	84	CJ	9.9	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	119	133	CJ	2.5	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System joints	120	28	CJ	12.9	feet	1.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	120	50	CJ	33.2	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System joints	120	136	CJ	2.5	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System joints	176	86	CJ	2.8	feet	2	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Crack	System joints	179	45	CJ	30.1	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System joints	180	155	CJ	1.5	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	181	69	CJ	6.8	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	181	135	CJ	5.7	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	181	111	CJ	2.9	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	183	86	CJ	5.6	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	199	63	CJ	37.7	feet	3	1/16 in.	Pr2		Yes
Stone_Crack	System joints	259	191	CJ	1.2	feet	0.25	1/16 in.	Pr2		Yes
Stone_Crack	System joints	260	33	CJ	15.6	feet	1.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	260	189	CJ	1.2	feet	1	1/16 in.	Pr2		No
Stone_Crack	System joints	263	191	CJ	1.2	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System joints	281	48	CJ	60.0	feet	1.5	1/16 in.	Pr2		Yes
Stone_Crack	System joints	281	92	CJ	36.8	feet	1.5	1/16 in.	Pr1		Yes
Stone_Crack	System units	37	163	CU	0.8	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units	262	92	CU	1.5	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	18	29	CUJ	5.0	feet	2.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	18	138	CUJ	10.7	feet	8	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	18	113	CUJ	21.7	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	18	151	CUJ	9.7	feet	8	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	18	183	CUJ	11.5	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	18	169	CUJ	14.7	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	20	26	CUJ	13.9	feet	1.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	23	25	CUJ	3.5	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	28	150	CUJ	1.7	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	36	135	CUJ	6.3	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	36	70	CUJ	4.9	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	38	27	CUJ	2.9	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	38	164	CUJ	2.6	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	38	43	CUJ	2.5	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	39	152	CUJ	1.5	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	41	42	CUJ	28.0	feet	1	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	43	24	CUJ	5.4	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	97	21	CUJ	1.7	feet	2.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	97	105	CUJ	18.6	feet	8	1/16 in.	Pr1		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Crack	System units and joints	97	125	CUJ	18.6	feet	8	1/16 in.	Pr1		No
Stone_Crack	System units and joints	97	143	CUJ	18.6	feet	8	1/16 in.	Pr1		No
Stone_Crack	System units and joints	97	162	CUJ	18.6	feet	8	1/16 in.	Pr1		No
Stone_Crack	System units and joints	97	181	CUJ	18.6	feet	8	1/16 in.	Pr1		No
Stone_Crack	System units and joints	98	20	CUJ	1.4	feet	1	1/16 in.	Pr2		No
Stone_Crack	System units and joints	99	24	CUJ	14.6	feet	1.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	100	173	CUJ	2.7	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	100	159	CUJ	9.5	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System units and joints	101	38	CUJ	30.4	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	103	26	CUJ	2.6	feet	0.75	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	103	129	CUJ	13.9	feet	2	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	103	162	CUJ	3.7	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System units and joints	103	189	CUJ	1.5	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	103	127	CUJ	24.2	feet	2	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	104	30	CUJ	1.7	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	112	67	CUJ	17.3	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	112	43	CUJ	1.6	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	117	45	CUJ	28.1	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	119	166	CUJ	5.9	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	120	186	CUJ	11.7	feet	4	1/16 in.	Pr2		No
Stone_Crack	System units and joints	177	178	CUJ	18.6	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	178	131	CUJ	4.3	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	179	148	CUJ	3.5	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	180	117	CUJ	10.6	feet	4	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	182	44	CUJ	10.0	feet	1	1/16 in.	Pr2		No
Stone_Crack	System units and joints	186	166	CUJ	8.2	feet	0	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	199	87	CUJ	21.8	feet	6	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	201	114	CUJ	13.0	feet	8	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	201	160	CUJ	15.0	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	202	183	CUJ	11.0	feet	20	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	202	96	CUJ	18.6	feet	12	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	202	148	CUJ	20.6	feet	16	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	255	130	CUJ	5.3	feet	3	1/16 in.	Pr2		No
Stone_Crack	System units and joints	256	144	CUJ	11.4	feet	2	1/16 in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Crack	System units and joints	258	29	CUJ	2.7	feet	1	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	261	132	CUJ	1.5	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System units and joints	262	138	CUJ	1.5	feet	0.5	1/16 in.	Pr2		No
Stone_Crack	System units and joints	262	28	CUJ	2.7	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	268	96	CUJ	5.1	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	277	28	CUJ	2.7	feet	0.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	280	121	CUJ	1.0	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	281	128	CUJ	1.5	feet	2	1/16 in.	Pr2		No
Stone_Crack	System units and joints	281	134	CUJ	3.0	feet	3	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	281	112	CUJ	1.0	feet	2	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	282	23	CUJ	7.6	feet	2.5	1/16 in.	Pr2		Yes
Stone_Crack	System units and joints	284	147	CUJ	9.9	feet	4	1/16 in.	Pr1		Yes
Stone_Crack	System units and joints	284	119	CUJ	1.5	feet	3	1/16 in.	Pr2		No
Stone_Crack	System units and joints	284	131	CUJ	1.5	feet	3	1/16 in.	Pr2		No
Stone_Displacement	Horizontal	18	162	Hor		units	3	1/8 in.	Pr1		Yes
Stone_Displacement	Horizontal	23	69	Hor		units	3	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	36	189	Hor	1.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	39	163	Hor	2.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	42	159	Hor		units	6	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	42	177	Hor		units	4	1/8 in.	Pr2		No
Stone_Displacement	Horizontal	42	185	Hor		units	4	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	42	165	Hor	9.0	units	8	1/8 in.	Pr1		Yes
Stone_Displacement	Horizontal	43	23	Hor	4.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	43	192	Hor	1.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	98	38	Hor	30.0	units	2	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	99	21	Hor	1.0	units	0.5	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	99	191	Hor	2.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	106	162	Hor	8.0	units	2	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	106	80	Hor	4.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	111	132	Hor	25.0	units	2	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	118	130	Hor	1.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	121	191	Hor	2.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	121	21	Hor		units	3	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	122	44	Hor	4.0	units	1	1/8 in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Displacement	Horizontal	123	54	Hor	40.0	units	2	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	176	24	Hor	7.0	units	2	1/8 in.	Pr2		No
Stone_Displacement	Horizontal	176	116	Hor	10.0	units	16	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	178	181	Hor	11.0	units	6	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	178	152	Hor	10.0	units	12	1/8 in.	Pr1		Yes
Stone_Displacement	Horizontal	178	94	Hor	10.0	units	8	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	178	108	Hor	10.0	units	8	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	178	167	Hor	10.0	units	8	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	178	190	Hor	1.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	183	137	Hor	1.0	units	2	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	184	42	Hor	3.0	units	4	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	198	158	Hor		units	2	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	259	71	Hor	2.0	units	2	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	260	135	Hor	1.0	units	3	1/8 in.	Pr1		Yes
Stone_Displacement	Horizontal	264	132	Hor	9.0	units	2	1/8 in.	Pr1		No
Stone_Displacement	Horizontal	264	158	Hor	2.0	units	2	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	264	129	Hor	1.0	units	1	1/8 in.	Pr2		No
Stone_Displacement	Horizontal	264	133	Hor	1.0	units	3	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	269	90	Hor	3.0	units	3	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	274	90	Hor	2.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	276	65	Hor	2.0	units	1	1/8 in.	Pr2		No
Stone_Displacement	Horizontal	279	166	Hor	1.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	282	89	Hor	2.0	units	3	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal	284	96	Hor	1.0	units	1	1/8 in.	Pr2		Yes
Stone_Displacement	Horizontal and Vertical	19	86	HV			3	1/8 in.	Pr2		Yes
Stone_Embedment	Ferrous Embedment	27	47	Fe					Pr3		No
Stone_Embedment	Ferrous Embedment	30	45	Fe					Pr3		No
Stone_Embedment	Ferrous Embedment	30	50	Fe					Pr3		Yes
Stone_Embedment	Ferrous Embedment	33	47	Fe					Pr3		No
Stone_Embedment	Ferrous Embedment	35	61	Fe					Pr3		Yes
Stone_Embedment	Ferrous Embedment	37	37	Fe					Pr3		No
Stone_Embedment	Ferrous Embedment	37	56	Fe					Pr3	anchor	No
Stone_Embedment	Ferrous Embedment	38	23	Fe					Pr2		Yes
Stone_Embedment	Ferrous Embedment	38	22	Fe					Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Embedment	Ferrous Embedment	39	157	Fe					Pr3	anchor	No
Stone_Embedment	Ferrous Embedment	39	177	Fe					Pr3	anchor	Yes
Stone_Embedment	Ferrous Embedment	39	111	Fe					Pr3	2 anchors	No
Stone_Joints	Mortar Caulked Failed	108	34	MorClkF	9.5	feet			Pr2		Yes
Stone_Joints	Mortar Failed	26	69	MorF	4.8	feet	70	percent	Pr2		Yes
Stone_Joints	Mortar Failed	27	66	MorF	11.3	feet	60	percent	Pr2		Yes
Stone_Joints	Mortar Failed	33	72	MorF	14.8	feet	50	percent	Pr2		Yes
Stone_Joints	Mortar Failed	39	68	MorF	5.4	feet	50	percent	Pr2		Yes
Stone_Joints	Mortar Failed	180	22	MorF	41.1	feet	25	percent	Pr2		Yes
Stone_Joints	Mortar Failed	197	191	MorF	0.0	feet	5	percent	Pr2		Yes
Stone_Joints	Mortar Failed	198	164	MorF	0.0	feet	100	percent	Pr2		Yes
Stone_Joints	Mortar Missing	19	155	MorM	1.1	feet	100	percent	Pr2		Yes
Stone_Joints	Mortar Missing	23	66	MorM	1.2	feet	100	percent	Pr2		Yes
Stone_Joints	Mortar Missing	182	158	MorM	1.0	feet		percent	Pr2		Yes
Stone_Joints	Mortar Missing	262	88	MorM	0.5	feet		percent	Pr2		No
Stone_Joints	Sealant Failed	27	71	SlntF	20.3	feet		percent	Pr2		Yes
Stone_Joints	Sealant Failed	29	188	SlntF	30.9	feet	100	percent	Pr2		Yes
Stone_Joints	Sealant Failed	30	37	SlntF	13.1	feet	100	percent	Pr2		Yes
Stone_Repair	Dutchman Failed	27	71	DF	12.0	sq. in.			Pr2		Yes
Stone_Repair	Dutchman Failed	35	23	DF		sq. in.			Pr2		Yes
Stone_Repair	Dutchman Failed	105	23	DF	27.0	sq. in.			Pr2		Yes
Stone_Repair	Dutchman Sound	266	22	D	25.0	sq. in.			Pr3		Yes
Stone_Repair	Dutchman Sound	275	23	D	36.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	18	22	PF	56.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	23	24	PF	40.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	31	147	PF	3.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	31	88	PF	8.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	102	31	PF	28.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	102	33	PF	30.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	105	93	PF	4.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	107	128	PF	15	sq. in.			Pr1		Yes
Stone_Repair	Patch Failed	119	23	PF	3000.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	183	25	PF	30.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	199	67	PF	30.0	sq. in.			Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Repair	Patch Failed	262	136	PF	24.0	sq. in.			Pr2		No
Stone_Repair	Patch Failed	267	34	PF	34.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Failed	277	71	PF	38.0	sq. in.			Pr2		Yes
Stone_Repair	Patch Sound	183	89	P	4.0	sq. in.			NA		Yes
Stone_Repair	Patch Sound	196	129	P		sq. in.			NA		Yes
Stone_SoilStain	Atmospheric	28	61	Atm	30.3	sq. ft.			Pr3		Yes
Stone_SoilStain	Atmospheric	109	37	Atm	19.3	sq. ft.			Pr3		Yes
Stone_SoilStain	Atmospheric	189	26	Atm	35.5	sq. ft.			Pr3		Yes
Stone_SoilStain	Atmospheric	190	23	Atm	59.6	sq. ft.			Pr3		Yes
Stone_SoilStain	Atmospheric	259	21	Atm	5.1	sq. ft.			Pr3		Yes
Stone_SoilStain	Atmospheric	281	21	Atm	1.8	sq. ft.			Pr3		Yes
Stone_SoilStain	Biological	27	35	Bio	15.8	sq. ft.			Pr3		Yes
Stone_SoilStain	Biological	28	32	Bio		sq. ft.			Pr3	nests	Yes
Stone_SoilStain	Biological	30	70	Bio	7.0	sq. ft.			Pr3		Yes
Stone_SoilStain	Biological	110	35	Bio	19.9	sq. ft.			Pr3		No
Stone_SoilStain	Black Crusts	106	22	Blck	3.6	sq. ft.			Pr2		Yes
Stone_SoilStain	Black Crusts	114	22	Blck	4.2	sq. ft.			Pr2		Yes
Stone_SoilStain	Black Crusts	265	21	Blck	7.9	sq. ft.			Pr2		Yes
Stone_SoilStain	Copper	24	24	Cpr	15.5	sq. ft.			Pr3		Yes
Stone_SoilStain	Copper	25	175	Cpr	89.2	sq. ft.			Pr3		Yes
Stone_SoilStain	Copper	37	26	Cpr	10.7	sq. ft.			Pr3		Yes
Stone_SoilStain	Copper	103	24	Cpr	13.5	sq. ft.			Pr2		Yes
Stone_SoilStain	Copper	116	25	Cpr	11.9	sq. ft.			Pr2		Yes
Stone_SoilStain	Copper	183	28	Cpr	7.7	sq. ft.			Pr3		Yes
Stone_SoilStain	Copper	196	27	Cpr	13.1	sq. ft.			Pr3		Yes
Stone_SoilStain	Copper	264	24	Cpr	11.2	sq. ft.			Pr2		Yes
Stone_SoilStain	Copper	271	178	Cpr	308.6	sq. ft.			Pr3		Yes
Stone_SoilStain	Copper	277	26	Cpr	15.3	sq. ft.			Pr3		Yes
Stone_SoilStain	Efflorescence	28	63	Eff	20.0	sq. ft.			Pr3		Yes
Stone_SoilStain	Guano	30	91	Gua	1.9	sq. ft.			Pr3		Yes
Stone_SoilStain	Rust	184	30	Rst	0.6	sq. ft.			Pr3		No
Stone_Spall	Bonded	24	125	B			20	sq. in.	Pr2		Yes
Stone_Spall	Bonded	26	173	B			8	sq. in.	Pr2		Yes
Stone_Spall	Bonded	35	123	B			25	sq. in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Bonded	38	138	B			2	sq. in.	Pr2		Yes
Stone_Spall	Bonded	39	186	B			75	sq. in.	Pr1		Yes
Stone_Spall	Bonded	39	63	B			20	sq. in.	Pr2		Yes
Stone_Spall	Bonded	40	181	B			100	sq. in.	Pr2		Yes
Stone_Spall	Bonded	40	46	B			4	sq. in.	Pr2		No
Stone_Spall	Bonded	101	132	B			10	sq. in.	Pr2		Yes
Stone_Spall	Bonded	111	129	B			15	sq. in.	Pr2		Yes
Stone_Spall	Bonded	115	172	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	186	114	B			8	sq. in.	Pr2		Yes
Stone_Spall	Bonded	187	60	B			6	sq. in.	Pr2		Yes
Stone_Spall	Bonded	188	131	B			15	sq. in.	Pr2		Yes
Stone_Spall	Bonded	190	154	B			8	sq. in.	Pr2		Yes
Stone_Spall	Bonded	196	43	B			5	sq. in.	Pr2		Yes
Stone_Spall	Bonded	198	159	B			15	sq. in.	Pr2		Yes
Stone_Spall	Bonded	199	124	B			20	sq. in.	Pr2		Yes
Stone_Spall	Bonded	259	68	B			13	sq. in.	Pr2		No
Stone_Spall	Bonded	259	67	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	261	36	B			3	sq. in.	Pr2		No
Stone_Spall	Bonded	261	37	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	261	158	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	261	87	B			16	sq. in.	Pr2		Yes
Stone_Spall	Bonded	261	71	B			6	sq. in.	Pr2		No
Stone_Spall	Bonded	261	47	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	262	48	B			5	sq. in.	Pr2		No
Stone_Spall	Bonded	262	173	B			5	sq. in.	Pr2		Yes
Stone_Spall	Bonded	262	189	B			9	sq. in.	Pr2		Yes
Stone_Spall	Bonded	262	192	B			16	sq. in.	Pr2		Yes
Stone_Spall	Bonded	262	88	B			4	sq. in.	Pr2		No
Stone_Spall	Bonded	262	168	B			1	sq. in.	Pr2		No
Stone_Spall	Bonded	262	157	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	262	71	B			4	sq. in.	Pr2		No
Stone_Spall	Bonded	262	110	B			3	sq. in.	Pr2		No
Stone_Spall	Bonded	262	167	B			12	sq. in.	Pr2		Yes
Stone_Spall	Bonded	262	133	B			8	sq. in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Bonded	263	36	B			30	sq. in.	Pr2		Yes
Stone_Spall	Bonded	263	135	B			48	sq. in.	Pr2		No
Stone_Spall	Bonded	263	75	B			18	sq. in.	Pr2		Yes
Stone_Spall	Bonded	264	167	B			4	sq. in.	Pr2		No
Stone_Spall	Bonded	264	34	B			5	sq. in.	Pr2		Yes
Stone_Spall	Bonded	264	71	B			32	sq. in.	Pr2		No
Stone_Spall	Bonded	264	155	B			12	sq. in.	Pr2		Yes
Stone_Spall	Bonded	265	87	B			10	sq. in.	Pr2		No
Stone_Spall	Bonded	265	159	B			30	sq. in.	Pr2		No
Stone_Spall	Bonded	265	85	B			10	sq. in.	Pr2		No
Stone_Spall	Bonded	265	75	B			12	sq. in.	Pr2		No
Stone_Spall	Bonded	265	55	B			40	sq. in.	Pr2		Yes
Stone_Spall	Bonded	265	35	B			8	sq. in.	Pr2		Yes
Stone_Spall	Bonded	268	93	B			30	sq. in.	Pr2		Yes
Stone_Spall	Bonded	269	88	B			8	sq. in.	Pr2		No
Stone_Spall	Bonded	269	129	B			10	sq. in.	Pr2		Yes
Stone_Spall	Bonded	270	73	B			12	sq. in.	Pr2		No
Stone_Spall	Bonded	270	74	B			40	sq. in.	Pr2		No
Stone_Spall	Bonded	270	75	B			12	sq. in.	Pr2		No
Stone_Spall	Bonded	270	76	B			10	sq. in.	Pr2		Yes
Stone_Spall	Bonded	270	88	B			40	sq. in.	Pr2		Yes
Stone_Spall	Bonded	271	85	B			20	sq. in.	Pr2		Yes
Stone_Spall	Bonded	271	86	B			20	sq. in.	Pr2		Yes
Stone_Spall	Bonded	272	35	B			14	sq. in.	Pr2		Yes
Stone_Spall	Bonded	272	78	B			5	sq. in.	Pr2		No
Stone_Spall	Bonded	273	86	B			12	sq. in.	Pr2		No
Stone_Spall	Bonded	273	34	B			12	sq. in.	Pr2		No
Stone_Spall	Bonded	273	68	B			20	sq. in.	Pr2		Yes
Stone_Spall	Bonded	273	88	B			40	sq. in.	Pr2		Yes
Stone_Spall	Bonded	275	34	B			2	sq. in.	Pr2		No
Stone_Spall	Bonded	275	89	B			5	sq. in.	Pr2		No
Stone_Spall	Bonded	275	64	B			30	sq. in.	Pr2		Yes
Stone_Spall	Bonded	276	34	B			5	sq. in.	Pr2		No
Stone_Spall	Bonded	276	63	B			75	sq. in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Bonded	276	35	B			10	sq. in.	Pr2		Yes
Stone_Spall	Bonded	277	86	B			12	sq. in.	Pr2		No
Stone_Spall	Bonded	277	35	B			10	sq. in.	Pr2		No
Stone_Spall	Bonded	277	130	B			18	sq. in.	Pr2		Yes
Stone_Spall	Bonded	277	49	B			4	sq. in.	Pr2		No
Stone_Spall	Bonded	278	158	B			1	sq. in.	Pr2		No
Stone_Spall	Bonded	278	89	B			6	sq. in.	Pr2		No
Stone_Spall	Bonded	278	44	B			24	sq. in.	Pr2		Yes
Stone_Spall	Bonded	278	35	B			7	sq. in.	Pr2		No
Stone_Spall	Bonded	278	33	B			14	sq. in.	Pr2		No
Stone_Spall	Bonded	279	90	B			15	sq. in.	Pr2		Yes
Stone_Spall	Bonded	279	35	B			5	sq. in.	Pr2		No
Stone_Spall	Bonded	281	97	B			6	sq. in.	Pr2		Yes
Stone_Spall	Bonded	282	174	B			20	sq. in.	Pr2		Yes
Stone_Spall	Hazardous	202	124	Haz			300	sq. in.	Pr1		Yes
Stone_Spall	Hazardous	269	130	Haz			1500	sq. in.	Pr1		Yes
Stone_Spall	Incipient	25	158	I			20	sq. in.	Pr2		Yes
Stone_Spall	Incipient	26	158	I			25	sq. in.	Pr2		Yes
Stone_Spall	Incipient	28	124	I			10	sq. in.	Pr2		Yes
Stone_Spall	Incipient	28	158	I			8	sq. in.	Pr2		Yes
Stone_Spall	Incipient	29	124	I			5	sq. in.	Pr2		Yes
Stone_Spall	Incipient	30	158	I			10	sq. in.	Pr2		Yes
Stone_Spall	Incipient	30	150	I			1	sq. in.	Pr2		No
Stone_Spall	Incipient	30	150	I			4	sq. in.	Pr2		Yes
Stone_Spall	Incipient	32	85	I			1	sq. in.	Pr2		Yes
Stone_Spall	Incipient	38	190	I			40	sq. in.	Pr1		Yes
Stone_Spall	Incipient	99	41	I			40	sq. in.	Pr2		Yes
Stone_Spall	Incipient	100	24	I			20	sq. in.	Pr2		Yes
Stone_Spall	Incipient	101	134	I			25	sq. in.	Pr2		Yes
Stone_Spall	Incipient	101	128	I			100	sq. in.	Pr2		Yes
Stone_Spall	Incipient	101	150	I			4	sq. in.	Pr2		Yes
Stone_Spall	Incipient	101	85	I			10	sq. in.	Pr2		Yes
Stone_Spall	Incipient	102	127	I			1	sq. in.	Pr2		Yes
Stone_Spall	Incipient	102	161	I			20	sq. in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Incipient	105	131	I			20	sq. in.	Pr2		Yes
Stone_Spall	Incipient	105	132	I			50	sq. in.	Pr1		Yes
Stone_Spall	Incipient	106	158	I			40	sq. in.	Pr1		Yes
Stone_Spall	Incipient	106	43	I			20	sq. in.	Pr2		Yes
Stone_Spall	Incipient	107	73	I			5	sq. in.	Pr2		No
Stone_Spall	Incipient	108	131	I			25	sq. in.	Pr2		Yes
Stone_Spall	Incipient	111	142	I			5	sq. in.	Pr2		No
Stone_Spall	Incipient	112	82	I			8	sq. in.	Pr2		Yes
Stone_Spall	Incipient	118	185	I			12	sq. in.	Pr2		Yes
Stone_Spall	Incipient	119	169	I			20	sq. in.	Pr2		Yes
Stone_Spall	Incipient	181	156	I			15	sq. in.	Pr2		Yes
Stone_Spall	Incipient	259	90	I			30	sq. in.	Pr2		Yes
Stone_Spall	Incipient	260	129	I			20	sq. in.	Pr2		Yes
Stone_Spall	Incipient	261	103	I			4	sq. in.	Pr2		No
Stone_Spall	Incipient	262	164	I			10	sq. in.	Pr2		No
Stone_Spall	Incipient	262	165	I			10	sq. in.	Pr2		Yes
Stone_Spall	Incipient	262	110	I			45	sq. in.	Pr2		No
Stone_Spall	Incipient	262	134	I			48	sq. in.	Pr2		No
Stone_Spall	Incipient	262	165	I			10	sq. in.	Pr2		No
Stone_Spall	Incipient	262	120	I			40	sq. in.	Pr2		No
Stone_Spall	Incipient	263	103	I			22	sq. in.	Pr2		No
Stone_Spall	Incipient	263	132	I			25	sq. in.	Pr2		No
Stone_Spall	Incipient	263	64	I			90	sq. in.	Pr2		Yes
Stone_Spall	Incipient	264	88	I			14	sq. in.	Pr2		No
Stone_Spall	Incipient	265	110	I			40	sq. in.	Pr2		Yes
Stone_Spall	Incipient	265	129	I			10	sq. in.	Pr2		Yes
Stone_Spall	Incipient	268	103	I			4	sq. in.	Pr2		No
Stone_Spall	Incipient	270	157	I			3	sq. in.	Pr2		No
Stone_Spall	Incipient	270	103	I			16	sq. in.	Pr2		Yes
Stone_Spall	Incipient	271	159	I			2	sq. in.	Pr2		Yes
Stone_Spall	Incipient	272	134	I			10	sq. in.	Pr2		No
Stone_Spall	Incipient	272	84	I			10	sq. in.	Pr2		No
Stone_Spall	Incipient	272	159	I			4	sq. in.	Pr2		No
Stone_Spall	Incipient	274	184	I			12	sq. in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Incipient	275	157	I			4	sq. in.	Pr2		Yes
Stone_Spall	Incipient	276	130	I			2	sq. in.	Pr2		No
Stone_Spall	Incipient	277	89	I			4	sq. in.	Pr2		No
Stone_Spall	Incipient	277	166	I			7	sq. in.	Pr2		Yes
Stone_Spall	Incipient	277	87	I			4	sq. in.	Pr2		No
Stone_Spall	Incipient	278	90	I			5	sq. in.	Pr2		No
Stone_Spall	Incipient	278	129	I			10	sq. in.	Pr2		Yes
Stone_Spall	Incipient	278	31	I			22	sq. in.	Pr2		Yes
Stone_Spall	Incipient	278	34	I			40	sq. in.	Pr2		Yes
Stone_Spall	Incipient	279	101	I			4	sq. in.	Pr2		No
Stone_Spall	Incipient	281	95	I			1	sq. in.	Pr2		No
Stone_Spall	Missing	20	23	M			30	sq. in.	Pr2		Yes
Stone_Spall	Missing	23	40	M			90	sq. in.	Pr2		Yes
Stone_Spall	Missing	27	28	M			8	sq. in.	Pr2		Yes
Stone_Spall	Missing	101	127	M			25	sq. in.	Pr2		Yes
Stone_Spall	Missing	102	27	M			6	sq. in.	Pr2		No
Stone_Spall	Missing	102	137	M			50	sq. in.	Pr2		No
Stone_Spall	Missing	103	65	M			100	sq. in.	Pr2		No
Stone_Spall	Missing	105	141	M			40	sq. in.	Pr2		No
Stone_Spall	Missing	105	65	M			100	sq. in.	Pr2		No
Stone_Spall	Missing	107	128	M			100	sq. in.	Pr2		Yes
Stone_Spall	Missing	107	133	M			300	sq. in.	Pr2		Yes
Stone_Spall	Missing	108	65	M			100	sq. in.	Pr2		No
Stone_Spall	Missing	109	128	M			400	sq. in.	Pr2		Yes
Stone_Spall	Missing	110	65	M			100	sq. in.	Pr2		No
Stone_Spall	Missing	111	65	M			100	sq. in.	Pr2		No
Stone_Spall	Missing	113	129	M			200	sq. in.	Pr2		Yes
Stone_Spall	Missing	114	130	M			20	sq. in.	Pr2		Yes
Stone_Spall	Missing	114	65	M			100	sq. in.	Pr2		No
Stone_Spall	Missing	116	65	M			100	sq. in.	Pr2		Yes
Stone_Spall	Missing	118	165	M			3	sq. in.	Pr2		No
Stone_Spall	Missing	119	170	M			20	sq. in.	Pr2		No
Stone_Spall	Missing	123	32	M			15	sq. in.	Pr2		Yes
Stone_Spall	Missing	176	32	M			6	sq. in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Missing	180	67	M			30	sq. in.	Pr2		Yes
Stone_Spall	Missing	183	67	M			25	sq. in.	Pr2		Yes
Stone_Spall	Missing	183	41	M			40	sq. in.	Pr2		Yes
Stone_Spall	Missing	183	44	M			20	sq. in.	Pr2		Yes
Stone_Spall	Missing	194	42	M			50	sq. in.	Pr2		Yes
Stone_Spall	Missing	197	126	M			10	sq. in.	Pr2		Yes
Stone_Spall	Missing	198	162	M			15	sq. in.	Pr2		Yes
Stone_Spall	Missing	199	189	M			150	sq. in.	Pr2		Yes
Stone_Spall	Missing	257	157	M			120	sq. in.	Pr2		No
Stone_Spall	Missing	257	169	M			36	sq. in.	Pr2		No
Stone_Spall	Missing	257	174	M			36	sq. in.	Pr2		Yes
Stone_Spall	Missing	257	163	M			150	sq. in.	Pr2		No
Stone_Spall	Missing	257	181	M			18	sq. in.	Pr2		No
Stone_Spall	Missing	258	68	M			18	sq. in.	Pr2		No
Stone_Spall	Missing	260	37	M			2	sq. in.	Pr2		No
Stone_Spall	Missing	261	74	M			9	sq. in.	Pr2		Yes
Stone_Spall	Missing	261	109	M			160	sq. in.	Pr1		Yes
Stone_Spall	Missing	262	120	M			28	sq. in.	Pr2		Yes
Stone_Spall	Missing	262	121	M			5	sq. in.	Pr2		No
Stone_Spall	Missing	262	154	M			3	sq. in.	Pr2		No
Stone_Spall	Missing	262	132	M			8	sq. in.	Pr2		Yes
Stone_Spall	Missing	263	157	M			2	sq. in.	Pr2		Yes
Stone_Spall	Missing	264	103	M			6	sq. in.	Pr2		Yes
Stone_Spall	Missing	265	89	M			100	sq. in.	Pr2		Yes
Stone_Spall	Missing	265	76	M			8	sq. in.	Pr2		No
Stone_Spall	Missing	265	36	M			4	sq. in.	Pr2		No
Stone_Spall	Missing	270	36	M			2	sq. in.	Pr2		No
Stone_Spall	Missing	270	188	M			5	sq. in.	Pr2		Yes
Stone_Spall	Missing	272	74	M			18	sq. in.	Pr2		No
Stone_Spall	Missing	272	71	M			18	sq. in.	Pr2		No
Stone_Spall	Missing	272	80	M			6	sq. in.	Pr2		No
Stone_Spall	Missing	273	48	M			15	sq. in.	Pr2		No
Stone_Spall	Missing	274	49	M			20	sq. in.	Pr2		No
Stone_Spall	Missing	274	54	M			10	sq. in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_Spall	Missing	274	71	M			18	sq. in.	Pr2		No
Stone_Spall	Missing	275	51	M			40	sq. in.	Pr2		Yes
Stone_Spall	Missing	275	34	M			15	sq. in.	Pr2		Yes
Stone_Spall	Missing	276	129	M			8	sq. in.	Pr2		Yes
Stone_Spall	Missing	276	134	M			6	sq. in.	Pr2		Yes
Stone_Spall	Missing	277	34	M			32	sq. in.	Pr2		Yes
Stone_Spall	Missing	277	167	M			8	sq. in.	Pr2		Yes
Stone_Spall	Missing	277	34	M			12	sq. in.	Pr2		No
Stone_Spall	Missing	278	85	M			16	sq. in.	Pr2		No
Stone_Spall	Missing	278	91	M			12	sq. in.	Pr2		No
Stone_Spall	Missing	278	80	M			18	sq. in.	Pr2		No
Stone_Spall	Missing	279	79	M			6	sq. in.	Pr2		No
Stone_Spall	Missing	279	89	M			2	sq. in.	Pr2		No
Stone_Spall	Missing	280	90	M			5	sq. in.	Pr2		No
Stone_Spall	Missing	282	162	M			24	sq. in.	Pr2		Yes
Stone_Spall	Removed	21	42	R			15	sq. in.	Pr2		Yes
Stone_Spall	Removed	22	132	R			25	sq. in.	Pr2		Yes
Stone_Spall	Removed	35	65	R			2	sq. in.	Pr2		Yes
Stone_Spall	Removed	40	46	R			2	sq. in.	Pr2		Yes
Stone_Spall	Removed	263	167	R			25	sq. in.	Pr2		Yes
Stone_SurfLoss	Chipped	35	159	Chp	2.6	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	37	64	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	38	71	Chp	1.0	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	39	125	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	100	43	Chp	2.3	sq. ft.	2	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	101	84	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	101	81	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	102	159	Chp	0.1	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	103	118	Chp	0.7	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	103	22	Chp	0.4	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	103	122	Chp	1.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	103	45	Chp	3.6	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	104	157	Chp	2.5	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	106	150	Chp	0.4	sq. ft.	1	1/8 in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_SurfLoss	Chipped	107	160	Chp	2.4	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	108	152	Chp	0.3	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	108	147	Chp	0.5	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	109	44	Chp	1.5	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	112	144	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	113	46	Chp	0.6	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	116	130	Chp	1.0	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	117	133	Chp	1.4	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	118	34	Chp	1.4	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	118	126	Chp	0.8	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	118	85	Chp	0.7	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	118	189	Chp	0.9	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	119	43	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	181	142	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	182	153	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	182	145	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	183	132	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	183	155	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	183	61	Chp	2.1	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	183	109	Chp	0.7	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	185	148	Chp	0.4	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	185	69	Chp	2.4	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	186	88	Chp	0.5	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	186	79	Chp	0.5	sq. ft.	2	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	259	121	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	260	91	Chp	0.6	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	260	35	Chp	0.8	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	261	88	Chp	0.6	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	262	158	Chp	1.0	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	262	128	Chp	1.0	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	262	102	Chp	0.4	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	262	112	Chp	0.4	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	263	56	Chp	0.1	sq. ft.	2	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	263	41	Chp	2.2	sq. ft.	1	1/8 in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Stone_SurfLoss	Chipped	263	54	Chp	0.1	sq. ft.	2	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	264	108	Chp	1.1	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	264	162	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	265	133	Chp	1.4	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	265	91	Chp	0.6	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	269	161	Chp	1.6	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Chipped	270	116	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	271	112	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	272	45	Chp	0.3	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	273	43	Chp	0.3	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	275	43	Chp	0.3	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Chipped	277	44	Chp	0.1	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Eroded	25	124	Erd	2.7	sq. ft.	2	1/8 in.	Pr3		Yes
Stone_SurfLoss	Eroded	25	177	Erd	4.5	sq. ft.	3	1/8 in.	Pr3		Yes
Stone_SurfLoss	Eroded	27	171	Erd	0.9	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Eroded	31	171	Erd	0.9	sq. ft.	1	1/8 in.	Pr2		No
Stone_SurfLoss	Eroded	37	171	Erd	0.9	sq. ft.	1	1/8 in.	Pr2		Yes
Stone_SurfLoss	Eroded	118	118	Erd	1.3	sq. ft.	3	1/8 in.	Pr3		Yes
Stone_SurfLoss	Eroded	197	131	Erd	0.8	sq. ft.	2	1/8 in.	Pr2		Yes
Stone_Unsecured	Missing	120	46	M	0.9	sq. ft.			Pr2		Yes
Stone_Unsecured	Missing	256	128	M	0.9	sq. ft.			Pr1		Yes
TerraCotta_Coating	Coating Failed	24	240	CtF	1.0	sq. ft.			Pr3		Yes
TerraCotta_Coating	Coating Failed	27	242	CtF	1.1	sq. ft.			Pr3		Yes
TerraCotta_Coating	Coating Failed	28	228	CtF	3.6	sq. ft.			Pr2		Yes
TerraCotta_Coating	Coating Failed	34	231	CtF	3.8	sq. ft.			Pr3		Yes
TerraCotta_Coating	Coating Failed	42	195	CtF	1.9	sq. ft.			Pr2		Yes
TerraCotta_Crack	Crazing	18	201	Crz	8.2	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	20	205	Crz	13.7	sq. ft.	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	22	230	Crz	2.5	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	23	233	Crz	5.1	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	27	236	Crz	2.4	sq. ft.	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	28	255	Crz	0.2	sq. ft.	0	1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	30	232	Crz	5.7	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	30	237	Crz	5.1	sq. ft.	0.5	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Crazing	31	262	Crz	4.9	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	33	255	Crz	0.2	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	33	250	Crz	6.9	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	34	237	Crz	1.0	sq. ft.	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	35	255	Crz	0.5	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	35	255	Crz	1.1	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	36	260	Crz	2.0	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	37	227	Crz	0.4	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	38	258	Crz	11.9	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	38	255	Crz	0.8	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	39	250	Crz	4.7	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	39	262	Crz	4.9	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	41	223	Crz	1.4	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	103	227	Crz	1.4	sq. ft.		1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	110	239	Crz	1.0	sq. ft.		1/16 in.	Pr3		Yes
TerraCotta_Crack	Crazing	178	224	Crz	2.7	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	182	233	Crz	0.6	sq. ft.		1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	184	224	Crz	15.1	sq. ft.		1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	185	242	Crz	0.4	sq. ft.		1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	185	195	Crz	5.8	sq. ft.		1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	187	227	Crz	0.1	sq. ft.	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	189	204	Crz	7.6	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	189	234	Crz	5.6	sq. ft.	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	191	202	Crz	6.7	sq. ft.	0	1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	193	236	Crz	4.9	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	194	203	Crz	7.0	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	196	233	Crz	3.4	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	196	238	Crz	3.4	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	198	222	Crz	2.2	sq. ft.		1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	199	196	Crz	9.2	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	199	204	Crz	8.3	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	259	204	Crz	0.4	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	266	202	Crz	0.2	sq. ft.	0	1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	267	238	Crz	0.5	sq. ft.	0	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Crazing	267	222	Crz	0.5	sq. ft.	0	1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	270	225	Crz	2.1	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	270	222	Crz	0.5	sq. ft.	0	1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	271	226	Crz	0.1	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	273	236	Crz	6.9	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	274	224	Crz	0.2	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	274	232	Crz	5.8	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	280	227	Crz	0.5	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	281	226	Crz	1.5	sq. ft.	0	1/16 in.	Pr2		No
TerraCotta_Crack	Crazing	281	222	Crz	1.3	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Crazing	282	224	Crz	2.0	sq. ft.	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Repair failed	28	199	CRprF	0.8	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Repair failed	30	199	CRprF	0.6	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Repair failed	40	195	CRprF	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Repair failed	187	230	CRprF	1.4	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	23	228	C	0.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	24	224	C	1.4	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	25	235	C	1.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	26	226	C	1.1	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	27	225	C	1.0	feet	1	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	27	235	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	27	204	C	0.4	feet	1	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	27	254	C	6.1	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	28	225	C	1.3	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	28	204	C	0.4	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	28	227	C	0.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	29	225	C	0.3	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	29	205	C	0.3	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	29	227	C	0.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	30	204	C	0.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	30	224	C	2.3	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	31	265	C	9.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	31	267	C	9.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	31	235	C	2.4	feet	0.5	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Single unit	32	235	C	0.6	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	32	226	C	1.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	32	223	C	0.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	32	223	C	1.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	33	236	C	0.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	33	264	C	9.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	33	225	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	267	C	4.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	243	C	6.3	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	258	C	5.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	261	C	4.5	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	234	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	260	C	4.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	34	271	C	1.0	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	35	245	C	0.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	35	234	C	0.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	35	250	C	10.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	36	245	C	0.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	36	226	C	0.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	36	258	C	13.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	37	235	C	0.6	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	37	208	C	2.4	feet	0.25	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	37	235	C	0.6	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	38	239	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	38	253	C	5.3	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	38	205	C	0.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	38	215	C	0.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	39	234	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	40	229	C	1.9	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	99	206	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	101	223	C	3.4	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	101	205	C	1.1	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	102	219	C	0.7	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	106	222	C	0.4	feet	0	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Single unit	107	256	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	107	259	C	1.4	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	107	231	C	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	107	238	C	0.6	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	108	267	C	0.8	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	108	222	C	1.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	108	256	C	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	109	248	C	0.9	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	109	225	C	2.1	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	110	256	C	0.7	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	110	227	C	1.5	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	110	269	C	1.3	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	110	267	C	0.8	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	111	257	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	111	260	C	1.1	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	111	224	C	33.1	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	112	260	C	0.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	113	263	C	0.6	feet	0.5	1/16 in.	Pr2	multiple	Yes
TerraCotta_Crack	Single unit	113	254	C	1.1	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	113	274	C	1.0	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	113	250	C	1.1	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	113	238	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	114	205	C	0.8	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	114	236	C	1.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	115	252	C	0.7	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	115	214	C	0.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	115	250	C	1.2	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	116	256	C	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	116	216	C	0.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	117	212	C	1.1	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	117	254	C	1.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	117	263	C	1.0	feet	0.5	1/16 in.	Pr2	multiple	Yes
TerraCotta_Crack	Single unit	120	204	C	0.6	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	179	199	C	0.9	feet	0	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Single unit	180	231	C	1.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	180	205	C	1.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	181	227	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	182	206	C	0.4	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	182	207	C	0.6	feet	0.25	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	182	232	C	0.6	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	183	245	C	0.6	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	184	206	C	0.6	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	184	239	C	1.6	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	184	234	C	0.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	185	255	C	1.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	225	C	0.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	226	C	1.2	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	235	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	233	C	0.6	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	256	C	0.8	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	236	C	1.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	253	C	1.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	186	222	C	1.2	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	187	263	C	1.5	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	187	259	C	1.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	187	271	C	1.0	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	187	275	C	1.0	feet	1	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	187	269	C	1.3	feet	1	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	188	235	C	0.4	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	188	275	C	1.0	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	188	256	C	0.8	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	189	257	C	0.5	feet	0.5	1/16 in.	Pr1		Yes
TerraCotta_Crack	Single unit	189	260	C	1.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	190	240	C	9.8	feet	0.5	1/16 in.	Pr2	at detail	Yes
TerraCotta_Crack	Single unit	190	226	C	0.8	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	190	250	C	0.7	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	190	267	C	0.7	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	191	269	C	1.4	feet	0	1/16 in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Single unit	192	269	C	1.7	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	192	232	C	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	192	250	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	192	261	C	0.7	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	192	262	C	1.5	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	193	259	C	1.6	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	194	257	C	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	196	247	C	0.9	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	196	256	C	0.9	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	197	228	C	2.0	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	198	232	C	2.1	feet	2	1/16 in.	Pr1		Yes
TerraCotta_Crack	Single unit	256	199	C	0.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	258	227	C	4.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	261	227	C	5.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	261	232	C	1.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	263	229	C	3.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	265	227	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	267	224	C	0.8	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	267	264	C	0.8	feet	0.5	1/16 in.	Pr2	multiple	No
TerraCotta_Crack	Single unit	267	233	C	14.0	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	267	226	C	5.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	268	227	C	0.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	268	224	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	268	250	C	0.7	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	269	256	C	1.0	feet	0.5	1/16 in.	Pr1		Yes
TerraCotta_Crack	Single unit	269	231	C	0.5	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	269	226	C	3.6	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	271	226	C	1.5	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	271	256	C	0.6	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	272	224	C	0.8	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	272	273	C	0.9	feet		1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	272	268	C	0.8	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	273	264	C	0.8	feet	0.5	1/16 in.	Pr2	multiple	Yes
TerraCotta_Crack	Single unit	273	250	C	1.0	feet	0	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	Single unit	273	260	C	0.7	feet	0.5	1/16 in.	Pr2	multiple	Yes
TerraCotta_Crack	Single unit	274	274	C	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	274	253	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	275	257	C	0.7	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	275	224	C	0.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	275	269	C	1.2	feet	1.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	276	257	C	0.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	277	257	C	0.5	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	277	262	C	1.1	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	278	260	C	0.8	feet	0.5	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	278	228	C	2.9	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	Single unit	279	229	C	1.0	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	281	204	C	0.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	281	225	C	2.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	Single unit	281	229	C	2.0	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	System joints	31	282	CJ	2.0	feet	16	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	25	226	CU	32.9	feet	1	1/16 in.	Pr2	17 balustrade units	Yes
TerraCotta_Crack	System units	30	235	CU	3.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	31	227	CU	0.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	101	227	CU	1.2	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	System units	107	263	CU	3.2	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	108	264	CU	5.6	feet	4	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	111	250	CU	1.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	114	268	CU	1.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	System units	119	228	CU	3.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	189	223	CU	0.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	190	235	CU	1.9	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	191	224	CU	18.7	feet	1	1/16 in.	Pr2	5 balustrade units	Yes
TerraCotta_Crack	System units	192	265	CU	1.2	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units	269	264	CU	1.8	feet	0	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	22	226	CUJ	2.1	feet	2	1/16 in.	Pr2	back side	Yes
TerraCotta_Crack	System units and joints	29	275	CUJ	20.2	feet	6	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	30	281	CUJ	17.9	feet	8	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	36	264	CUJ	4.5	feet	0.5	1/16 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Crack	System units and joints	117	261	CUJ	2.4	feet	0	1/16 in.	Pr2		No
TerraCotta_Crack	System units and joints	119	225	CUJ	3.1	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	191	261	CUJ	3.4	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	192	274	CUJ	8.1	feet	12	1/16 in.	Pr1		Yes
TerraCotta_Crack	System units and joints	194	261	CUJ	1.9	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	268	273	CUJ	3.7	feet	1	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	270	270	CUJ	2.7	feet	3	1/16 in.	Pr2		No
TerraCotta_Crack	System units and joints	270	273	CUJ	4.0	feet	2	1/16 in.	Pr2		No
TerraCotta_Crack	System units and joints	275	247	CUJ	2.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Crack	System units and joints	277	256	CUJ	2.7	feet	0.5	1/16 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	24	234	Hor		units	3	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	27	277	Hor	4	units	4	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	27	243	Hor	1	units	1	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	33	275	Hor	5	units	8	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	33	250	Hor	1	units	1	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	33	245	Hor	2	units	1	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	34	244	Hor	4	units	2	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	35	281	Hor	5	units	3	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	39	256	Hor	1	units	3	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	107	249	Hor	1	units	2	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	108	278	Hor	5	units	4	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	111	275	Hor	6	units	4	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	187	246	Hor	1	units	1	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	188	278	Hor	6	units	4	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	191	279	Hor	7	units	6	1/8 in.	Pr1		No
TerraCotta_Displacement	Horizontal	192	246	Hor	1	units	1	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	194	205	Hor		units	2	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal	271	276	Hor	6	units	4	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal and Vertical	96	206	HV	2	units	4	1/8 in.	Pr2		Yes
TerraCotta_Displacement	Horizontal and Vertical	179	193	HV	1	units	1	1/8 in.	Pr2		Yes
TerraCotta_Joints	Mortar Caulked	268	272	MorClk	8.7	feet	100	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	17	204	MorClkF	10.6	feet	80	percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	18	253	MorClkF	57.9	feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	19	206	MorClkF	19.2	feet	80	percent	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Joints	Mortar Caulked Failed	19	195	MorClkF	13.2	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	21	224	MorClkF	12.2	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	21	264	MorClkF	52.7	feet		percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	22	219	MorClkF	19.5	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	23	196	MorClkF	15.8	feet	70	percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	24	214	MorClkF	41.4	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	26	231	MorClkF	30.4	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	27	247	MorClkF	25.6	feet	50	percent	Pr2	Universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	28	230	MorClkF	23.1	feet	100	percent	Pr2	universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	30	207	MorClkF	18.6	feet	100	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	31	247	MorClkF	20.2	feet		percent	Pr2	universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	31	219	MorClkF	17.3	feet		percent	Pr2	universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	37	247	MorClkF	35.2	feet		percent	Pr2	universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	42	234	MorClkF	38.1	feet		percent	Pr2	universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	42	223	MorClkF	22.5	feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	43	218	MorClkF	60.4	feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	46	200	MorClkF	33.6	feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	109	260	MorClkF		feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	189	272	MorClkF		feet	100	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	190	251	MorClkF	46.4	feet	100	percent	Pr2	universal	Yes
TerraCotta_Joints	Mortar Caulked Failed	193	248	MorClkF	29.9	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	194	231	MorClkF	28.3	feet	60	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	194	238	MorClkF	9.1	feet	50	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	195	248	MorClkF	25.0	feet	80	percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	198	224	MorClkF	14.9	feet	80	percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	258	222	MorClkF	49.5	feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	260	232	MorClkF	46.8	feet		percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	267	277	MorClkF	36.5	feet		percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	280	245	MorClkF	78.4	feet		percent	Pr2		Yes
TerraCotta_Joints	Mortar Caulked Failed	282	214	MorClkF	72.1	feet		percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	286	205	MorClkF	68.8	feet		percent	Pr2		No
TerraCotta_Joints	Mortar Caulked Failed	286	196	MorClkF	80.6	feet		percent	Pr2		No
TerraCotta_Joints	Mortar Failed	28	236	MorF	20.0	feet		percent	Pr2	weeps	Yes
TerraCotta_Joints	Mortar Failed	36	237	MorF	0.0	feet	100	percent	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Joints	Mortar Failed	196	212	MorF	93.4	feet	80	percent	Pr2		No
TerraCotta_Joints	Sealant Failed	190	268	SlntF		feet	100	percent	Pr2		Yes
TerraCotta_Joints	Sealant Failed	270	270	SlntF	17.3	feet	100	percent	Pr2		No
TerraCotta_Repair	Patch Failed	22	206	PF	10.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	25	204	PF	15.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	27	233	PF	2.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	28	229	PF	2.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	32	238	PF	1.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	34	227	PF	1.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	40	193	PF	5.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	113	259	PF	15.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	114	256	PF	20.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	187	203	PF	10.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	188	242	PF	2.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	192	222	PF	1.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	194	252	PF	2.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	203	207	PF	3.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Patch Failed	268	239	PF	2.0	sq. in.			Pr2		Yes
TerraCotta_Repair	Replacement	194	265	Rpl	0.6	sq. ft.			NA	at this unit	Yes
TerraCotta_SoilStain	Biological	31	255	Bio	2.3	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Biological	37	255	Bio	6.9	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Biological	41	225	Bio	1.4	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Biological	101	221	Bio	0.3	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Biological	108	251	Bio	0.2	sq. ft.			Pr2	oozing	Yes
TerraCotta_SoilStain	Biological	181	221	Bio	1.0	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Copper	24	235	Cpr	0.7	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Copper	267	268	Cpr	2.7	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Copper	271	269	Cpr	2.2	sq. ft.			Pr2		No
TerraCotta_SoilStain	Leached Salts	38	219	Lch	0.6	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	39	227	Lch	1.0	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	39	222	Lch	3.6	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	98	223	Lch	6.0	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	102	230	Lch	0.6	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	119	221	Lch	0.5	sq. ft.			Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_SoilStain	Leached Salts	179	225	Lch	3.0	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	185	205	Lch	0.2	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Leached Salts	185	256	Lch	0.3	sq. ft.			Pr2		No
TerraCotta_SoilStain	Leached Salts	270	257	Lch	0.3	sq. ft.			Pr2		No
TerraCotta_SoilStain	Rust	27	225	Rst	0.9	sq. ft.			Pr3	Railing Cap	Yes
TerraCotta_SoilStain	Rust	28	267	Rst	5.9	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	30	238	Rst	7.4	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	32	267	Rst	7.8	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	34	222	Rst	2.3	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	34	240	Rst	0.4	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	35	259	Rst	0.7	sq. ft.			Pr3		No
TerraCotta_SoilStain	Rust	36	267	Rst	6.8	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	38	225	Rst	7.8	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	38	260	Rst	6.2	sq. ft.			Pr3		No
TerraCotta_SoilStain	Rust	111	269	Rst	2.2	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	117	226	Rst	16.7	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	179	227	Rst	1.9	sq. ft.			Pr3		No
TerraCotta_SoilStain	Rust	183	226	Rst	8.4	sq. ft.			Pr3		No
TerraCotta_SoilStain	Rust	186	226	Rst	2.3	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	188	246	Rst	6.9	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	191	268	Rst	2.1	sq. ft.			Pr2		Yes
TerraCotta_SoilStain	Rust	262	222	Rst	4.8	sq. ft.			Pr3		No
TerraCotta_SoilStain	Rust	270	199	Rst	0.6	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	274	226	Rst	10.5	sq. ft.			Pr3		No
TerraCotta_SoilStain	Rust	275	271	Rst	5.4	sq. ft.			Pr3		Yes
TerraCotta_SoilStain	Rust	277	222	Rst	4.8	sq. ft.			Pr3		No
TerraCotta_Spall	Bonded	24	203	B			25	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	31	275	B			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	35	261	B			50	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	42	195	B			6	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	100	224	B			6	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	109	226	B			30	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	113	271	B			12	sq. in.	Pr1		Yes
TerraCotta_Spall	Bonded	115	258	B			600	sq. in.	Pr1		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Spall	Bonded	123	205	B			3	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	179	195	B			5	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	193	224	B			45	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	262	222	B			4	sq. in.	Pr2		No
TerraCotta_Spall	Bonded	267	206	B			6	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	268	273	B			50	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	271	272	B			12	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	272	237	B			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	274	270	B			5	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	275	259	B			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Bonded	278	215	B			10	sq. in.	Pr2		Yes
TerraCotta_Spall	Hazardous	188	271	Haz			20	sq. in.	Pr1		Yes
TerraCotta_Spall	Hazardous	191	274	Haz			20	sq. in.	Pr1		Yes
TerraCotta_Spall	Hazardous	268	274	Haz			15	sq. in.	Pr1		Yes
TerraCotta_Spall	Incipient	25	205	I			40	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	29	201	I			3	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	31	203	I			8	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	34	195	I			3	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	37	203	I			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	40	225	I			30	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	40	223	I			20	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	118	226	I			20	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	180	223	I			40	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	194	250	I			20	sq. in.	Pr2		Yes
TerraCotta_Spall	Incipient	269	273	I			30	sq. in.	Pr2		No
TerraCotta_Spall	Incipient	274	259	I			5	sq. in.	Pr2	two	Yes
TerraCotta_Spall	Missing	21	203	M			8	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	23	204	M			8	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	26	237	M			20	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	30	223	M			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	30	268	M			20	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	32	204	M			8	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	33	204	M			8	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	36	247	M			10	sq. in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_Spall	Missing	105	204	M			3	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	192	194	M			5	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	194	206	M			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	197	206	M			15	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	260	230	M			4	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	264	203	M			15	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	265	223	M			18	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	267	203	M			9	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	271	203	M			30	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	272	223	M			12	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	274	223	M			2	sq. in.	Pr2		Yes
TerraCotta_Spall	Missing	281	206	M			12	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	25	203	R			40	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	28	259	R			10	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	34	253	R			8	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	34	204	R			14	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	39	223	R			3	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	40	203	R			30	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	42	203	R			5	sq. in.	Pr2		Yes
TerraCotta_Spall	Removed	272	259	R			5	sq. in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	34	242	Chp	0.1	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	38	203	Chp	0.1	sq. ft.	2	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	38	240	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	39	220	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	41	199	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	101	201	Chp	0.1	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	109	238	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	112	238	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	114	251	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	176	202	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	177	198	Chp	0.2	sq. ft.	2	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	179	217	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	181	224	Chp	0.5	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	181	196	Chp	0.2	sq. ft.	2	1/8 in.	Pr2		No

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_SurfLoss	Chipped	182	237	Chp	0.3	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	184	230	Chp	0.2	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	187	217	Chp	0.1	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	189	228	Chp	0.5	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Chipped	189	252	Chp	0.3	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	267	220	Chp	0.0	sq. ft.	1	1/8 in.	Pr3		Yes
TerraCotta_SurfLoss	Chipped	270	268	Chp	0.9	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	271	220	Chp	0.0	sq. ft.	1	1/8 in.	Pr3		No
TerraCotta_SurfLoss	Chipped	274	257	Chp	0.3	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Chipped	283	205	Chp	0.1	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	21	226	Glz	4.7	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	21	224	Glz	0.2	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	22	224	Glz	0.5	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	23	224	Glz	0.9	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	26	228	Glz	1.6	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	28	241	Glz	0.3	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	29	241	Glz	0.9	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	30	270	Glz	68.4	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	32	262	Glz	0.5	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	32	256	Glz	0.2	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	33	238	Glz	0.5	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	33	260	Glz	0.7	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	33	271	Glz	10.7	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	34	268	Glz	1.2	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	34	265	Glz	0.5	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	34	279	Glz	0.2	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	34	238	Glz	0.3	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	35	255	Glz	1.5	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	37	249	Glz	1.7	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	37	252	Glz	0.8	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	37	241	Glz	0.3	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	37	255	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	40	206	Glz	0.4	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	40	230	Glz	4.2	sq. ft.		1/8 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_SurfLoss	Glaze loss	40	215	Glz	0.6	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	42	229	Glz	1.1	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	43	225	Glz	2.0	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	98	222	Glz	2.3	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	100	230	Glz	13.7	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	104	205	Glz	0.7	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	105	223	Glz	0.3	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	107	244	Glz	1.3	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	109	271	Glz	5.9	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	110	279	Glz	3.1	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	111	254	Glz	0.8	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	111	264	Glz	0.7	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	112	258	Glz	0.2	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	112	242	Glz	1.3	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	113	203	Glz	1.3	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	114	271	Glz	4.6	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	117	220	Glz	0.3	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	118	208	Glz	0.5	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	118	222	Glz	11.7	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	123	207	Glz	0.2	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	126	204	Glz	0.1	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	173	207	Glz	0.0	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	173	204	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	178	226	Glz	2.6	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	179	229	Glz	0.8	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	181	219	Glz	4.6	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	182	225	Glz	0.3	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	182	230	Glz	1.0	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	184	241	Glz	1.3	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	185	221	Glz	2.3	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	187	270	Glz		sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	187	219	Glz	3.5	sq. ft.		1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	188	239	Glz	0.6	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	188	242	Glz	1.0	sq. ft.	0.5	1/8 in.	Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
TerraCotta_SurfLoss	Glaze loss	188	273	Glz	0.8	sq. ft.	1	1/8 in.	Pr3		No
TerraCotta_SurfLoss	Glaze loss	189	270	Glz	0.8	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	190	278	Glz	1.4	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	190	274	Glz	1.5	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	192	277	Glz	2.2	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	192	238	Glz	0.2	sq. ft.	0.5	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	199	226	Glz	4.4	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	256	205	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	258	193	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	258	202	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	260	224	Glz	6.7	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	260	196	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	261	204	Glz	0.1	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	261	206	Glz	0.2	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	266	272	Glz	0.6	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	267	273	Glz	0.3	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	267	270	Glz	0.8	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	267	200	Glz	0.5	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	268	271	Glz	0.8	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_SurfLoss	Glaze loss	268	214	Glz	0.0	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	268	273	Glz	0.2	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	268	273	Glz	0.6	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	269	276	Glz	4.5	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	269	214	Glz	0.0	sq. ft.	0	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	270	274	Glz	2.5	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	271	270	Glz	0.0	sq. ft.	1	1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	272	255	Glz	1.7	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	274	272	Glz	2.3	sq. ft.		1/8 in.	Pr2		No
TerraCotta_SurfLoss	Glaze loss	279	225	Glz	2.9	sq. ft.	1	1/8 in.	Pr2		Yes
TerraCotta_Unsecured	Hollow	36	257	H	1.4	sq. ft.			Pr2		Yes
Wood_Coating	Coating Failed	30	163	CtF	5.6	sq. ft.			Pr2		Yes
Wood_Coating	Coating Failed	30	97	CtF	6.2	sq. ft.			Pr2		Yes
Wood_Coating	Coating Failed	30	75	CtF	22.9	sq. ft.			Pr2		Yes
Wood_Coating	Coating Failed	30	140	CtF	5.6	sq. ft.			Pr2		Yes

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Amount	Unit	Severity	Unit	Priority	Note	Photos
Wood_Coating	Coating Failed	31	118	CtF	5.6	sq. ft.			Pr2		No
Wood_Coating	Coating Failed	109	52	CtF	12.6	sq. ft.			Pr2		Yes
Wood_Deteriorated	Rotten	189	37	Rot	7.2	sq. ft.	2	1/8 in.	Pr2		Yes
Wood_Deteriorated	Rotten	189	150	Rot	7.3	sq. ft.	2	1/8 in.	Pr2		Yes
Wood_Deteriorated	Rotten	190	105	Rot	5.8	sq. ft.	2	1/8 in.	Pr2		Yes
Wood_Deteriorated	Rotten	190	126	Rot	7.9	sq. ft.	2	1/8 in.	Pr2		Yes
Wood_Deteriorated	Rotten	190	60	Rot	8.1	sq. ft.	2	1/8 in.	Pr2		No
Wood_Deteriorated	Rotten	190	84	Rot	6.5	sq. ft.	2	1/8 in.	Pr2		Yes
Wood_Deteriorated	Weathered	30	73	Wthr	19.8	sq. ft.	1	1/8 in.	Pr2		Yes
Wood_Joints	Sealant Failed	30	71	SlntF	17.8	feet			Pr2		No
Wood_Joints	Sealant Failed	109	46	SlntF	14.2	feet			Pr2		No

TPAS® User's Manual

Guide to TPAS Annotated Drawings

Tablet PC Annotation System (TPAS®)

Updated August 2017

Quick Start

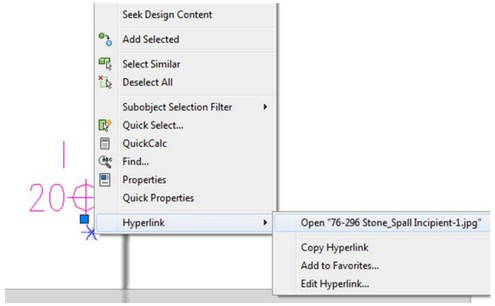
The Tablet PC Annotation System (TPAS®) allows direct input of both visual and numerical survey data into an AutoCAD drawing during investigations of buildings and other structures. The annotated drawings are delivered in three formats: paper drawings, PDF files, and AutoCAD DWG files. Survey photographs are delivered in both hard copy and digital format. **The most efficient way to view the survey photographs is to open them directly from the AutoCAD drawing**; if AutoCAD is not available, it is also possible to reference printed or digital photographs from the printed or PDF drawing. Both methods are discussed below.

Open digital photographs using the AutoCAD hyperlinks

Survey photographs can be opened and viewed from within the AutoCAD drawing using the hyperlinks, which appear as blue asterisks. Not all observations are photographed. Before using the hyperlinks for the first time (and each time the digital files are transferred to a new computer or the file folders are renamed) **you must edit the HYPERLINKBASE setting in order for AutoCAD to be able to locate the hyperlinked photographs.**

1. Make sure that all of the hyperlinked photos are in a single folder in the computer.
2. Type HYPERLINKBASE at the AutoCAD command line, and hit enter.
3. Open the folder containing the hyperlinked photos and copy the folder's file path from the Windows "Address Bar."
4. Paste the folder's file path into the command line, and hit enter.

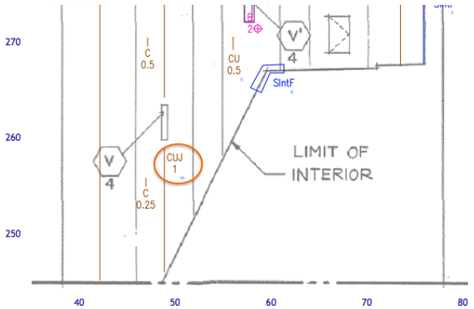
In recent versions of AutoCAD, CTRL + click on the hyperlink to open the photograph. In older versions, select the link, then right-click anywhere in the drawing. Choose *Hyperlink* at the bottom of the drop-down menu, then choose *Open "filename.jpg."*



Use x-y coordinates to match photographs to condition locations

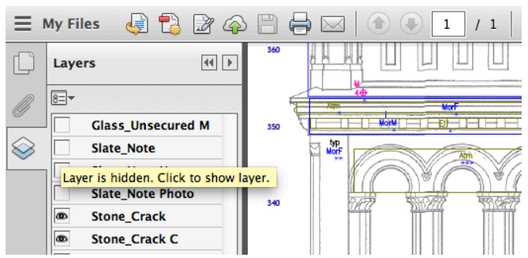
Each survey photograph is named with a unique X-Y coordinate (not necessarily the beginning of the photo name) corresponding to its location on the drawing. Photo locations are referenced by their X-Y coordinates within the report narrative. If AutoCAD is not available, use the X-Y coordinates to match annotated conditions on the drawings to the corresponding printed photographs.

50-256 Stone_Crack System units and joints-1



Manage layers in the PDF drawing for selective viewing and printing

All of the TPAS annotations are grouped together on layers named for each material and condition, and these layers can be turned on and off for ease of viewing. Open the PDF drawing in Adobe Reader to access the layer management panel. Print additional copies of the drawing showing only the selected layers, if desired. The PDF drawings may be printed full-size (typically 24” x 36”) or reduced.



View AutoCAD drawings with raster background images

Raster images - taken from PDFs, JPEGs, or other file formats - are sometimes used as background references for TPAS drawings in AutoCAD. In order for the background to appear in the AutoCAD drawing, the referenced file must be stored in the same folder as the AutoCAD drawing. The referenced file is included on the deliverables DVD.

AutoCAD Features

This section addresses more advanced digital analysis of the TPAS survey data, for users familiar with basic AutoCAD features including model and paper space, layers, and blocks.

Print AutoCAD drawings

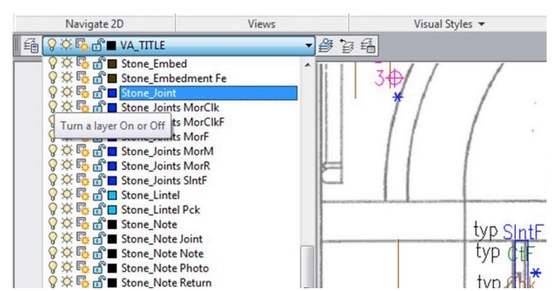
As-delivered printed drawings can be reproduced from the AutoCAD DWG file. All TPAS annotations are created in model space with a 9” text height, in order to plot at 3/32” in a 1/8” = 1’ drawing view.

TPAS drawings are plotted, or printed, from paper space layouts. Title block information and drawing keys are present directly in paper space—no external references are used. The x-y coordinates shown on the paper drawings are model space data visible through veiwports.

Manage layers in AutoCAD

All of the TPAS annotations are grouped together on layers named for each material and condition, and these layers can be turned on and off for ease of viewing. Photo hyperlinks are on the same layer as the condition with which they are associated.

Use the AutoCAD Layer Manager to turn layers on and off, and to freeze and thaw layers: use the LAYER command, choose Layer from the Format menu, or click the layer button on the Object Properties Toolbar.



In paper space, the “Current VP Freeze” option becomes available in the Layer Manager. This allows each viewport to have its own freeze/thaw layer settings, allowing the user to present multiple combinations of layers on a single print layout.

To freeze or thaw layers in a paper space viewport:

1. Select the viewport.
2. Set the viewport to Model by clicking the Model/Paper button at the bottom of the AutoCAD window (or by double clicking anywhere within the viewport boundaries).
3. Open the Layer Manager.
4. Use the “Current VP Freeze” column to freeze or thaw layers within the current viewport.

View and edit conditions data recorded in block attributes

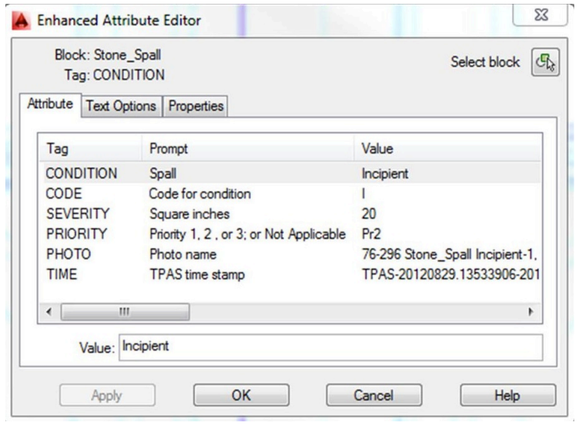
All TPAS annotations consist of *blocks* - pre-drawn and reusable graphical symbols that represent distinct material conditions. *Block attributes* are text labels that add descriptive information to a block. During the investigation, quantitative data about survey conditions (e.g. crack widths or areas of soiling) are entered as block attributes.

Standard TPAS blocks contain seven attributes: Condition, Code, Severity, Amount, Priority, Photo, and Time. All blocks contain the Condition, Code, Photo, and Time attributes; all others are optional. In cases of observations that are not photographed, the Photo attribute will be blank.

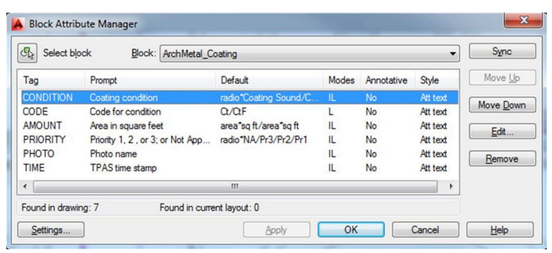
It is possible to add custom attributes to standard blocks, or to create entire custom blocks. For clarity, typically only the Code and Severity attributes are visible in the drawing; all others are set in Invisible Mode and do not print or appear in model or paper space.

To view and/or edit a block’s attributes, open the Enhanced Attribute Editor command by double-clicking on a block reference containing attributes (or from the command line –EATTEDIT, from the

Ribbon: Home tab>Block Panel>Edit Attributes, from the menubar: Modify>Object>Attribute> Single, or from the Modify II toolbar). The Enhanced Attribute Editor can only access and edit an individual block reference and therefore will not affect block definitions. Attributes in Invisible Mode do appear in the editor, and are available for editing.



Global changes to blocks with attributes are made with the Block Editor, which accesses and edits block definitions. Launch the Block Editor from the command line—BEDIT, from the Ribbon: Home tab>Block panel>Block Editor, from the menubar: Tools>Block Editor or from the Modify II toolbar.



The Block Editor is not available in AutoCAD 2000/2002 or 2004. In those versions, use the Block Attribute Manager, which is launched from the command line—BATTMAN, the Modify menu: Modify>Object>Attribute>Block Attribute Manager or the Modify II toolbar.

Both methods are available in recent releases of AutoCAD. For in depth guidance, refer to the AutoCAD Help documentation.

Extract survey data from block attributes

Survey data in the form of block attributes can be exported to a spreadsheet or database application, in several file formats depending on the version of AutoCAD in which the extraction is performed.

For the purposes of survey annotations, the information extracted includes block names, X-Y insertion coordinates, and block attribute values. Use the commands ATTOUT (most efficient method,) DATAEXTRACTION or ATTEXT to extract block attribute values and other information.

The process of extracting data varies substantially among various AutoCAD releases. Refer to the AutoCAD Help documentation for specific capabilities and procedures.

Archival Research

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- Developmental History
- Bibliography

Date: September 30, 1910 ***Photo: City of Springfield***

Developmental History

Springfield Campanile

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The Springfield Campanile is one of three connected Neoclassical structures, designed and built concurrently, which comprise the City of Springfield Municipal Group. The buildings were designed by the firm Pell & Corbett of New York City, based upon their winning design competition entry. Construction began in late 1909 and the Municipal Group was dedicated in December 1913.

This report summarizes the developmental history of the Springfield Campanile based on the organization of Part 1 of a Historic Structure Report as defined by National Park Service.[1] Archival research was undertaken in order to better understand the construction methods and existing conditions of the Campanile. While the Campanile is part of a grouping of structures designed and built concurrently as the City of Springfield "Municipal Group", this report focuses on the Campanile.

Study Summary

Vertical Access was retained by Bruner/Cott Architects to perform an exterior investigation of the Springfield Campanile in Springfield, MA to assist the design team in the discovery process in advance of the development of repair recommendations. A variety of primary and secondary source materials held by various institutions were utilized in the preparation of this report.

Project Data

The Springfield Campanile is one of three connected structures, designed and built concurrently, which comprise the City of Springfield Municipal Group, located at 36 Court Street. The campanile is at the center of the symmetrical grouping, with Symphony Hall to the southwest and City Hall to the northeast. A U-shaped parking area is located to the rear (northwest) of the Campanile. The grouping occupies approximately 2.5 acres and the principal façades of the structures face Springfield's Court Square. The buildings are owned by the City of Springfield and are listed on the National Register of Historic Places as contributing structures in the Court Square Historic District[2] and included in the Downtown Springfield Multiple Resource Area.[3] The Municipal Group was documented by the Historic American Buildings Survey in 1981.[4]

[1] Deborah Slaton, "Preservation Brief 43: The Preparation and Use of Historic Structure Reports." National Park Service, U.S. Department of the Interior.
[2] "Court Square Historic District," National Register of Historic Places Inventory - Nomination Form, United States Department of the Interior, National Park Service, May 24, 1974.

Physical Description

The Municipal Group consists of three Neoclassical structures in a symmetrical arrangement, with the Campanile in the center flanked by the identical temple façades of Symphony Hall and City Hall. The buildings' principal façades face Court Square to the southeast and their main entrances are accessed via a half-flight of monumental steps. The buildings are clad primarily in Indiana limestone, with terra cotta ornament at the upper elevations.

The Campanile is square in plan and rises approximately 270 feet from a raised terrace with a limestone balustrade connecting it to City Hall to the northeast and Symphony Hall to the southwest. The tower tapers from approximately 28 feet by 28 feet at the base to approximately 25 feet by 25 feet just below the main observation level. The steel frame from grade to just below the lower observation level is clad in Indiana limestone with brick back-up. The steel structure above is clad in terra cotta with brick back-up, and topped with a sheet metal ball-and-rod finial. The two observation levels have terra cotta balustrades; above them is an open lower belfry level containing 12 bells. An upper belfry level is the topmost accessible exterior level. The interior of the octagonal pyramid roof is accessible through a hatch from the upper belfry level. A sheet metal ball-and-rod finial (originally glass) crowns the structure.

The principal façade of the Campanile features a small balcony at an elevation of approximately 50 feet above the raised terrace. Clock faces on all four façades of the tower have ornate bronze clock hands and bronze numerals backlit by round windows. Doors with cast bronze bas-relief panels lead into the Campanile from the raised terrace at the southeast, northeast, and southwest façades.

At the interior, an open steel stair provides access from the basement level at grade to the upper observation level, while the belfry levels are accessed via ladders. A single elevator car historically provided access between the basement level and the lower observation level, but is not currently operational. Narrow windows are located at stair landings on the southeast and northwest façades, while the northeast and southwest façades each have a single window above the terrace-level entrances. At the interior of the terrace level is a vaulted ceiling of Guastavino tile.

[3] "Downtown Springfield Multiple Resource Area," National Register of Historic Places Inventory - Nomination Form, United States Department of the Interior, National Park Service, November 10, 1982. This document includes a thorough social and architectural history of Springfield.
[4] "Springfield Municipal Group, 36 Court Street, Springfield, Hampden County, MA," Historic American Buildings Survey, Survey number HABS MA-1172, 1981. Library of Congress, Call No. HABS MASS,7-SPRIF,4-.

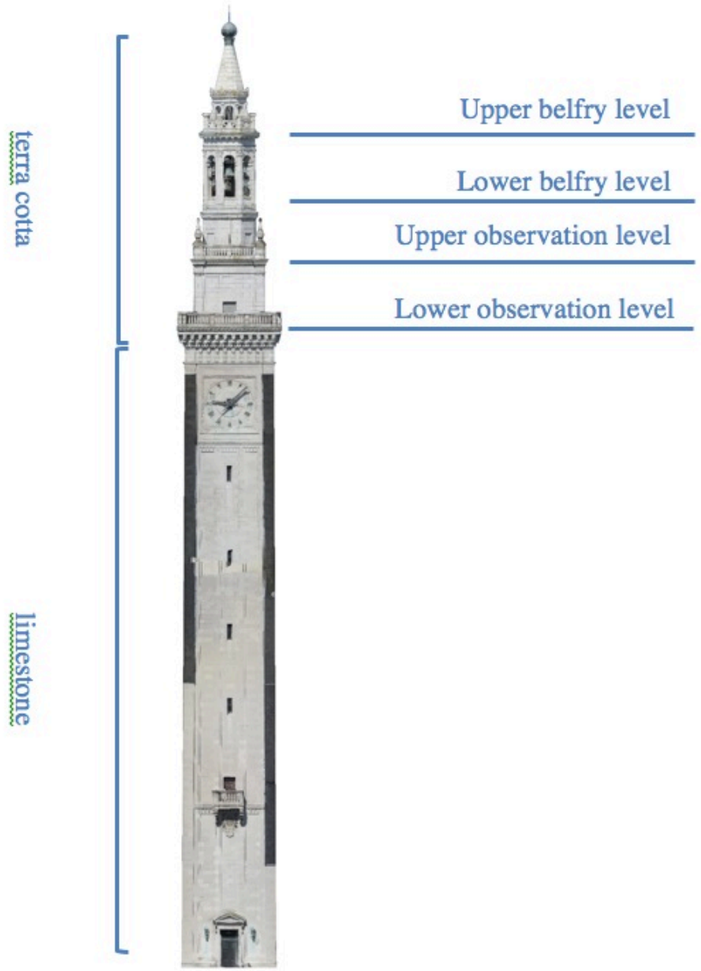

Figure 1. Court Street façade

Historical Background and Context

Following the destruction of Springfield's City Hall by fire in 1906, an architectural competition was held to select a design for a new municipal building. Professor Warren Powers Laird of the University of Pennsylvania served as competition advisor to the city of Springfield and the chairman of the building committee was George Dwight Pratt. The winning submission by F. Livingston Pell (1873-1945) and Wiley Corbett (1873-1954) of New York City was selected in 1908. Pell & Corbett was a prominent architecture firm in the early 20th century, and designed many well-known public buildings across the northeast United States. Corbett was a proponent of modernism and the tall building, and he was widely published in the architectural press during his career.

Pell & Corbett were among five firms invited by the building commission to submit designs; the open competition yielded several dozen more submissions in the first round. The competition brief called for a multi-use "Municipal Building" encompassing offices and meeting spaces, an auditorium, and tower.[5] The program specified that the tower be of "considerable height" and include a clock, bell chimes, and an observation level with access provided by elevator.

Chronology and Development of Use

For many years, the public was able to access the main observation level by elevator. The elevator also provided access for chimes ringers to reach the console at the interior of the upper observation level. By the mid-1950s, police radio communications equipment was installed at the top of the Campanile, requiring regular access by police personnel. The Campanile was closed to the public periodically for repairs throughout the 20th century, and has been closed since the elevator was taken out of service in 2005. Radio communications equipment at the upper levels of the tower is no longer operational.

Construction - 1909 to 1913

Following the design competition, modifications were made to Pell & Corbett's design at the request of the building committee, and working drawings were prepared. Hollis French & Allen Hubbard of Boston provided general engineering services, while Gunvald Aus was consulting engineer for the steel structure.[6] Horton and Hemenway of Boston laid the foundation, A.E. Stephens Co. erected the tower and served as general contractor, and the Clinton Fireproofing Company provided reinforced concrete. The Clerk of the Works for the entire project was Frederick O. Klakring.

The first contracts for the construction of the Municipal Group were awarded in late 1909, and the cornerstone of the Campanile bears the date 1910. Steel work for the Campanile was underway by late August 2010; the third tier was completed by September 13, and the 7th tier

[5] "Competition for the Selection of an Architect for a Municipal Building in the City of Springfield Massachusetts" 1908. Copies are held in the collections of the Springfield History Library and Archives as well as the Architectural Archives at the University of Pennsylvania. The other four firms or architects invited to the competition were Cass Gilbert, Hale & Rogers, Lord & Hewlett (all of New York), and Peabody & Stearns of Boston.
[6] "Personal Notes," *The Engineering Record*: *Building Record and Sanitary Engineer*, New York: McGraw Publishing Co, Vol. 60, October 23, 1909 (page 37).

was reached by September 30. The steel was completed to the lower observation level by October 18, 1910.[7]

At this time, it was decided that 25 feet of height would be added to the tower. Harvey Wiley Corbett recounted this change to the original building plans in a 1914 article in the journal *Architecture*:

> "When the steel frame reached a point level with the first landing stage, i.e., the top of the plain shaft, the silhouette of the steel work gave a fairly accurate idea of the finished mass of that portion of the structure. We, as architects, decided that the tower was not high enough. In fact, the foreshortening seemed so great that one could not believe but that some mistake had been make in the steel work. … However, the steel silhouette was not satisfactory and we determined, after very careful consideration of the matter and the making of many more studies, to recommend an increase in the height of the tower of 25 feet at an estimated cost of about $15,000. … This increase in height was made partly in the plain shaft and partly in each of the stages above."[8]

Comparisons of the design drawings to as-built drawings and other documentation confirms that approximately 25 feet was added to the overall height of the tower. Pell & Corbett's design drawings of 1909 show A-shaped cross-bracing in the topmost section of steel comprising the main, limestone portion of the tower. A photograph of the Court Street façade dated January 8, 1911 (Figure 2) shows the steel completed to this level, with limestone cladding in place past the second window. The completed tower has four windows on the Court Street façade, as opposed to the three shown in the design drawings. The spacing between the third and fourth windows deviates from the spacing of windows below by about 2 1/2 feet due to the location of the steel cross-bracing. Enough height was added to the tower to accommodate a fourth window while allowing space for the roughly 16-foot by 16-foot clock face and surround (see Figure 3).

[7] Dated construction photographs in the collection of the Springfield History Library and Archives, Springfield Pictures Collection, Series 01 Box 08, Folders 101-109.12.
[8] Harvey Wiley Corbett, "Comment on Competitions and the Results of One," *Architecture*, Vol. 29, No. 6, June 1914.

Figure 2. Court Street façade, January 18, 1911[9]

[9] Collection of Springfield History Library and Archives, Springfield Pictures Collection, Series 01 Box 08, Folders 101-109.12.

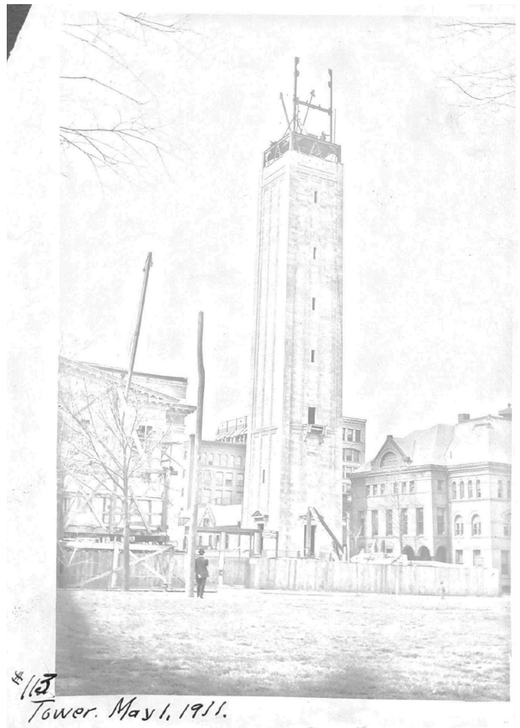

Figure 3. Court Street façade, May 1, 1911[10]

Corbett's 1914 article in *Architecture* includes photographs of the exteriors and interiors of the Municipal Group buildings along with an oversized plate showing plans, a section, and an elevation of the upper portion of the Campanile. Elsewhere in the June 1914 issue, advertisements appear from various suppliers and firms that worked on the Municipal Group; these include additional images of the interiors and exteriors. These firms include W. & J. Sloane (woodwork, decoration, and furnishings), P. & F. Corbin (door hardware), Berry Brothers' Architectural Finishes, Architectural Plastering Co., Inc., and the E. Howard Clock Company.

The Springfield History Library and Archives holds several boxes' worth of material dating from the design competition, construction, and dedication of the Municipal Group. Included in this collection are several dozen photographs documenting the construction[11]. The riveted steel frame of the Campanile visible in the photographs appears generally consistent with the structural design shown in Pell & Corbett's construction drawings. Based on the photographs, horizontal

[10] Collection of Springfield History Library and Archives, Springfield Pictures Collection, Series 01 Box 08, Folders 101-109.12.
[11] Ibid.

steel framing members (shelf angles) are present at midpoints between floor landings on the rear façade only.

Figure 4. Court Street façade, October 18, 1910.[12]

Installation of the limestone cladding of the campanile was underway by November 8, 1910. The masonry walls generally consist of 4 to 6 wythes of brick back-up and 4-inch-thick limestone veneer panels. The Campanile's steel structure and masonry cladding are consistent with other early steel-frame structures, in that the structural steel is encased in the back-up masonry with no gap. At this early stage of steel frame construction, the need to provide separation between the steel frame and masonry systems was not well understood. Furthermore, with the exception of the rear elevation, there do not appear to be shelf angles between the horizontal beams at floor landings, which are 24 feet or more apart. As a result, the Campanile suffers from significant

[12] Collection of Springfield History Library and Archives, Springfield Pictures Collection, Series 01 Box 08, Folders 101-109.12.

cracking and displacement of the limestone cladding and brick masonry back-up due to the differential rates of thermal movement of the steel and masonry materials, exacerbated by corrosion of the steel.

The hydraulically-powered Otis elevator, a significant interior feature of the Campanile, was installed in 1911.

On April 4, 1911, a bomb exploded in the base of the Campanile, one of dozens of bombings across the U.S. orchestrated by an iron workers labor organization over the span of several years. At the time of the bombing, the steel frame was complete and the masonry cladding was in place up to 185 feet. The blast did not cause any structural damage and did not significantly delay the construction.[13]

The Campanile and Symphony Hall were largely finished before construction began on City Hall in order to allow the continued use of an existing building on the site. The ball finial, bells, and clock hands were not installed until at least late winter of 1912, based on a photograph dated February 1 of that year.[14] The three completed buildings were dedicated December 8-9, 1913.

The Library of Congress has three undated photographs of the Campanile in its collection.[15] The first shows the full height of the campanile's southeast and southwest façades. The spiral stair is visible at the belfry levels. In this image, construction fencing is still in place and the carillon bells, clock hands, and clock numerals are not yet installed. Also notable in this image is the absence of the urn-shaped metal lanterns at the lower observation level, which appear in early photographs of the Campanile. The second image, taken from the east and showing the tower's southeast and northeast façades, appears to be contemporaneous; the construction fencing is in place and the clock hands, numerals, and bells are not present. The third photograph was taken from the same direction as the second, but at an elevated vantage point. In this image, the bells and clock numerals have been installed, but not the clock hands, and the metal lanterns are present at the lower observation level. It is unknown when the metal lanterns were removed, however Springfield was struck by the Great New England Hurricane of 1938, which caused extensive wind damage across the region.

[13] "Campanile Withstands Bomb But Years Take Their Toll," *Springfield Union*, July 2, 1966.
[14] Collection of Springfield History Library and Archives, Springfield Pictures Collection, Series 01 Box 08, Folders 101-109.12, item I-102-1.
[15] Library of Congress, Call No.s LC-D4-73081, LC-D4-500755, LC-D4-73082, and LC-D4-72938.

Figure 5. View from the east across Court Square of the completed Municipal Group.[16] Note the presence of urn-shaped metal fixtures at the main observation level.

[16] Library of Congress, Call No. LC-D4-73082.

Repairs and Condition Investigations - 1940s to present

Documentation of repairs to the Campanile prior to 1966 is largely in the form of newspaper articles and does not provide much detail on the work that was undertaken. Based on available resources, it appears that the only major repair project at the exterior took place in 1966-67 and was limited to the terra cotta portion of the tower. Other work to the tower includes repointing of masonry joints, application of sealant to 100% of the terra cotta joints, attempted repairs or waterproofing to cracks in the limestone, and the installation of debris netting at all four façades. Extensive cracking through the limestone cladding appears to have been a problem at least as early as the 1960s.

It has been speculated that damage to the Campanile occurred during the Great New England Hurricane of 1938. A 1965 newspaper article states, "Damage to the Campanile, dating in all probability from the severe strain at the time of the hurricane in September, 1938, was revealed when workmen began making repairs to the Municipal Group."[17] A 2008 article recounting the severe damage across the region states, "Workers in City Hall were evacuated when the campanile began to sway dangerously."[18]

The earliest work for which documentation could be found occurred in 1947, when repairs were made by a local steeplejack after "several chunks" of terra cotta material fell to the terrace below and the area at the base of the tower was closed to the public.[19] In 1954 a contract was awarded to Jordan Waterproofing Co. of New York for additional repairs to the terra cotta[20]. The tower had been closed by the Building Commissioner earlier that year. Repairs were completed and the tower reopened in August of 1954.[21]

Concerns over the safety of the elevator were raised as early as 1956, when the Building Commissioner ordered it closed.[22] Municipal officials and employees, including the Superintendent of Public Buildings and the chime ringer, continued to use the elevator after it was ordered grounded, generating a legal dispute covered by the local press.[23] Funding was allocated in 1957 to implement safety upgrades, repairs were completed, and the elevator was reopened to the public in June 1958.[24]

[17] "Looking Backward 25 years ago" *Springfield Daily News*, May 21, 1965.
[18] Stan Freeman, "Deadly storm took New England by Surprise," *The Republican Newsroom,* September 21, 2008. (https://www.masslive.com/news/index.ssf/2008/09/deadly_storm_took_new_england.html) accessed December 11, 2018.
[19] "Gerliep, the Human Fly, Starts Job Of Repairing the Campanile Tower," *Springfield Daily News*, August 13, 1947.
[20] "Contract Let For Campanile Work," Springfield Daily News, July 8, 1954. The hand-written date on the newspaper clipping might read 1954 or 1959. The date is presumed to be 1954 based on the reference in a 1964 article to a "major overhaul" having taken place in 1954.
[21] "Lofty Tower Once Again to be Reopened," *Springfield Daily News*, August 25, 1954.
[22] "Orders Under Scrutiny In Row Over City Elevator," *Springfield Union*, November 6, 1956.
[23] "Campanile Chimes Ring as Officials Defy Robertson," *Springfield Daily News,* November , 1956.
[24] "It Hasn't Changed: Campanile Elevator Finally Fixed, and the View Is Lovely," *Springfield Daily News*, June 30, 1958.

The Campanile was closed to the public again that year, when Jordan Waterproofing Co. performed additional repairs. A contemporary newspaper article states that a large crack had opened, "presumably by a lightning bolt," the repair of which was included in the contract.[25]

An engineering study was authorized in 1964 after "large chunks of rock" fell from the structure. It appears that spalling material had been falling from the tower for some time, as a contemporary newspaper article notes that the structure was "beset every year by flaking and spalling problems."[26] A report by the Building Commissioner identified "excessive cracks and spalling in the limestone facing and cornice." A probe was opened at the interior, exposing corroded structural steel members.[27] It appears that the extensive vertical crack systems at the corners of the limestone cladding had appeared by this time; a May 1965 newspaper article states, "Cracks have opened up in the masonry up and down the sides of the Campanile and it will be necessary to put through quite a program of pointing up and other repairs."[28]

Hoyle, Doran and Berry Architects (HDBA) of Boston carried out the conditions assessment of tower and developed repair recommendations. A. Belanger & Sons, Inc., also known as Belanger Construction Co., performed the repairs recommended by HDBA beginning in the summer of 1966. A contemporary newspaper article states that replacement terra cotta was to be produced by the Federal Seaboard Terra Cotta Company of Perth Amboy, New Jersey.[29] As part of the project, all of the terra cotta and backup masonry above the main observation level was removed. Three photographs in the collection of the Springfield History Library and Archives show the progression of work: a May 30, 1966 image shows the Campanile before removal of the original terra cotta; a February 1967 photograph shows the portion of the steel frame above the clock faces entirely stripped of masonry; and a December 1967 photograph shows the reinstalled terra cotta.[30] New reinforced-concrete floors were also installed during the project.

Several sheets of drawings from the 1960s restoration of the tower are held in the city archives. These include a site plan, plans at various tower elevations, a section through the tower above the clock face, elevations of the Court Street and side of the terra cotta portion, a plan showing the arrangement of the bells, detail elevations and sections of the terra cotta assemblies, structural framing and details, and electrical layouts. According to the 1999 Feasibility Study for Repairs to Campanile Tower prepared by Stopfel, Inc. Architects, the completed work on the belfry differed from HDBA's specifications as shown in a 1966 drawing.[31] Minor alterations were made to the decorative details of the terra cotta at this time; early drawings and photographs show acorn finials atop the eight piers at the upper belfry level which are no longer extant.

[25] "City Ready to Again Close Campanile," *Springfield Daily News*, August 29, 1958.
[26] "Awaits Word About Tower," *Springfield Daily News*, September 14, 1964.
[27] "City Will Hire Engineers on Two Problems," *Springfield Union*, March 31, 1964.
[28] "Looking Backward 25 years ago" *Springfield Daily News*, May 21, 1965.
[29] "300-Foot Hoist to Rise Soon at Campanile Site," *Springfield Union,* June 9, 1966. Federal Seaboard Terra Cotta Corporation ceased operations in 1968.
[30] Maury Dashevsky, three photographs of the Springfield Campanile. Collection of the Springfield History Library and Archives, Springfield Pictures Collection, Series 01 Box 08, Folders 101-109.12, items I-103-1 (February 1967), I-103-8 (December 1967), and I-103-9 (May 30, 1966).
[31] Stopfel, Inc. Architects, "Feasibility Study for Repairs to Campanile Tower," Stopfel, Inc. Architects, Boston, July 1999.

A group of four March 1967 drawings by HDBA shows existing cracks at the limestone of the Campanile on all façades, noting "majority of cracks appear to be full depth of stone." In addition to cracks up to 3/4" wide at the corners, a 3/8" wide horizontal crack is identified at roughly 80 feet above the terrace level on the City Hall elevation. While HDBA documented damage to the limestone cladding (likely taking advantage of the scaffolding in place for the work on the upper tower to access the limestone portion of the tower), no documentation exists for any subsequent repairs or maintenance to the limestone. The tower was reopened to the public in November 1967, and restoration work on the clock and carillon was completed in early spring of 1968.[32]

In 1972 a vertical crack estimated at 15 to 20 feet in length was noted at the southeast corner nearly halfway up the tower.[33] A binocular inspection was performed by the Superintendent of Public Buildings. The Deputy Building Commissioner noted "several cracks in the tower noticeable from street level on the north face of the building," but said he was unaware of major cracks on the Court Street façade. Around this time, the Campanile was closed to the public for elevator repairs; it reopened in July 1974.[34]

Another round of repair work began in 1977 on all three structures comprising the Municipal Group. It appears that repointing was carried out on the Campanile at this time. John Strandberg of Reinhardt Associates was the architect and Harlow Restoration Corp. of Farmingdale, NY was the contractor.[35]

Plans for renovations to City Hall in the early 1980s included proposed repairs to the Campanile elevator, clock, and chimes.[36] The architect for the project was Reinhardt Associates and the contractor was Fontaine Brothers of Springfield. A March 1982 newspaper article states that renovation work was expected to begin the following month[37]. Repairs to the Campanile were not included in the base bid, and only elevator repairs were included as additional options in the final bid documents. It is not clear whether the elevator repairs were carried out.

A visual investigation of the Campanile's interior and exterior was performed by Vanasse Hangen Brustlin, Inc. (VHB) of Watertown, MA in 1996. Exterior access was limited to approximately 100 feet above grade. VHB's report documents extensive vertical cracking through the limestone at the corners of the tower, noting the presence of failed sealant repairs.

A 1999 Feasibility Study by Stopfel, Inc., Architects includes condition assessments, recommended repairs, and cost estimates for the Campanile carillon, clock mechanism, elevator, and other systems, in addition to the structural and masonry components of the building. Two exploratory probes were opened in the exterior masonry by Phoenix Baystate Construction Co.,

[32] "Inspection of Campanile Crack Today," *Springfield Union*, February 7, 1972.
[33] Ibid.
[34] "Campanile Opening Big Bronze Doors To Visiting Public," *Springfield Daily News*, July 6, 1974.
[35] "Renovation Starts Monday," *Springfield Union*, November 19, 1977.
[36] "City Hall plans returned for reworking," January 29, 1981. Collection of the Springfield Museums History Library.
[37] "City Hall work to cost $1.7 million," *Springfield Union*, March 10, 1982.

Inc. during the study. Stopfel's report includes recommendation options for temporary stabilization.

The Campanile's elevator was taken out of service in March 2005 due to its unsafe condition and has not been operational since that time.[38] In 2007, CBI Consulting, Inc. prepared an existing condition survey of the exterior envelopes of the entire Springfield Municipal Group, as well as the interior of the Campanile. Several masonry probes were opened as part of this investigation. The base of the Campanile had been fenced by this time, in order to protect the public from unsafe masonry conditions. The photographs included in the CBI report show the limestone crack systems and displacement, including evidence of previous repair attempts. The CBI investigation appears to be the last condition assessment of the Campanile to have taken place prior to the installation of debris netting at three of the four exterior corners of the tower prior to 2010. Netting was installed at the west corner in April 2018 by CAN USA.

Timeline and Summary of Alterations

- Date of alteration unknown. A glass ball-and-rod finial (presumably illuminated at night) is shown in the construction drawings, the as-built drawings published in the journal *Architecture,* and in early photographs. The current finial is sheet metal.
- Date of alteration unknown. Removal of urn-shaped metal lanterns at the four corners of the lower observation level.
- Date of alteration unknown. A spiral stair, shown in the as-built drawings and visible in early photographs, was replaced with ladders providing access from the interior of the upper observation level to the lower and upper belfry levels.
- 1947. Repairs to terra cotta.
- 1954. Repairs to terra cotta.
- 1958. Elevator repairs.
- 1966-67. Major reconstruction of terra cotta portion of tower.
- 1968. Clock and carillon repairs completed.
- 1974. Elevator repairs.
- 1977. Masonry repointing.
- 1996. String lights installed.
- 2005. Elevator taken out of service.
- Ca. 2007-2010 debris netting installed at three exterior corners.
- April 2018. Debris netting installed at west corner.

Other Documentation

The Springfield Municipal Group is listed in a booklet published by the A.E. Stephens Company showcasing the firm's work, and included photographs of several institutional and public buildings in Massachusetts and New York State.[39]

[38] CBI Consulting, Inc., "Existing Conditions Report" Prepared for the Springfield Municipal Group, Boston, November 21, 2007 (page 4).
[39] *Buildings Erected by A.E. Stephens Company*, Architectural Catalog Co., Inc., New York. Based upon known dates of construction of the listed buildings, the booklet was published after about 1930.

A drawing made by the Guastavino Fireproof Construction Company is in the collection of the Avery Architectural & Fine Arts Library at Columbia University.[40] Unfortunately, at the time of this investigation, archivists could not locate the drawing.

The Municipal Group was documented by the Historic American Buildings Survey in 1981. Nine photographs were included with the record: the principal exterior elevations of the group (including the full height of the Campanile), the southeast (principal) and northeast elevations of City Hall, a detail of a bronze door, and the interiors of several spaces within City Hall.

Dozens of photographs made by the *Springfield Republican* over nearly 40 years are available online.[41] The collection includes a 1987 aerial photograph of the terra cotta portion of the tower in which glaze loss at the conical roof is discernable, and a February 2010 photograph showing that debris netting had been installed at three exterior corners by that date.

Summary of Research Findings

The Springfield Campanile is typical of early-20th-century steel-frame structures built without separation between the structural steel and the back-up masonry. As a result, it has exhibited damage in the form of extensive cracking through the limestone veneer for well over half a century. Probe openings made as part of various investigations over the years have confirmed this detail as well as corrosion of the steel frame. While design drawings exist for the 1960s reconstruction of the terra cotta portion of the tower, as-built details may differ and are unconfirmed. Aside from minor changes to the terra cotta detailing and replacement of the original finial, the campanile retains its original exterior finishes, contributing to the historic character and significance of the Municipal Group.

Respectfully submitted for Vertical Access LLC by:

Kristen Olson
December 14, 2018

[40] "Municipal bldgs at Springfield, Mass. [graphic] : [sections and plan of vault]" Ink on linen drawing. Collection of Avery Architectural & Fine Arts Library, Columbia University. Call No. NYDA.1963.002.00681
[41] https://www.masslive.com/news/index.ssf/2014/03/springfield_campanile_restorat.html Accessed on December 11, 2018.

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- **Editorial** *(Architecture, The Professional Architectural Monthly , June 1914)*
- **Architectural Drawings** *(Hoyle, Doran, and Berry Architects, 1966)*
- **News Clippings** *(Various Publications and Dates)*

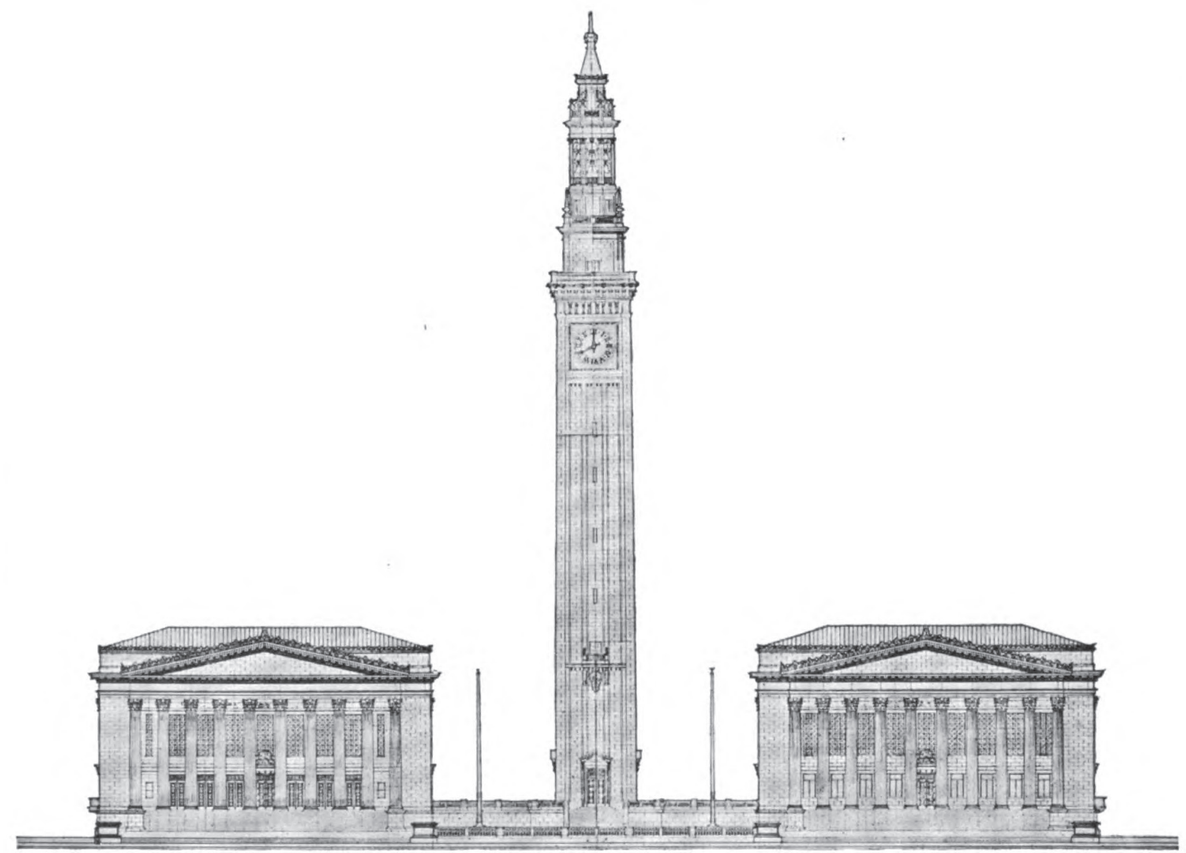
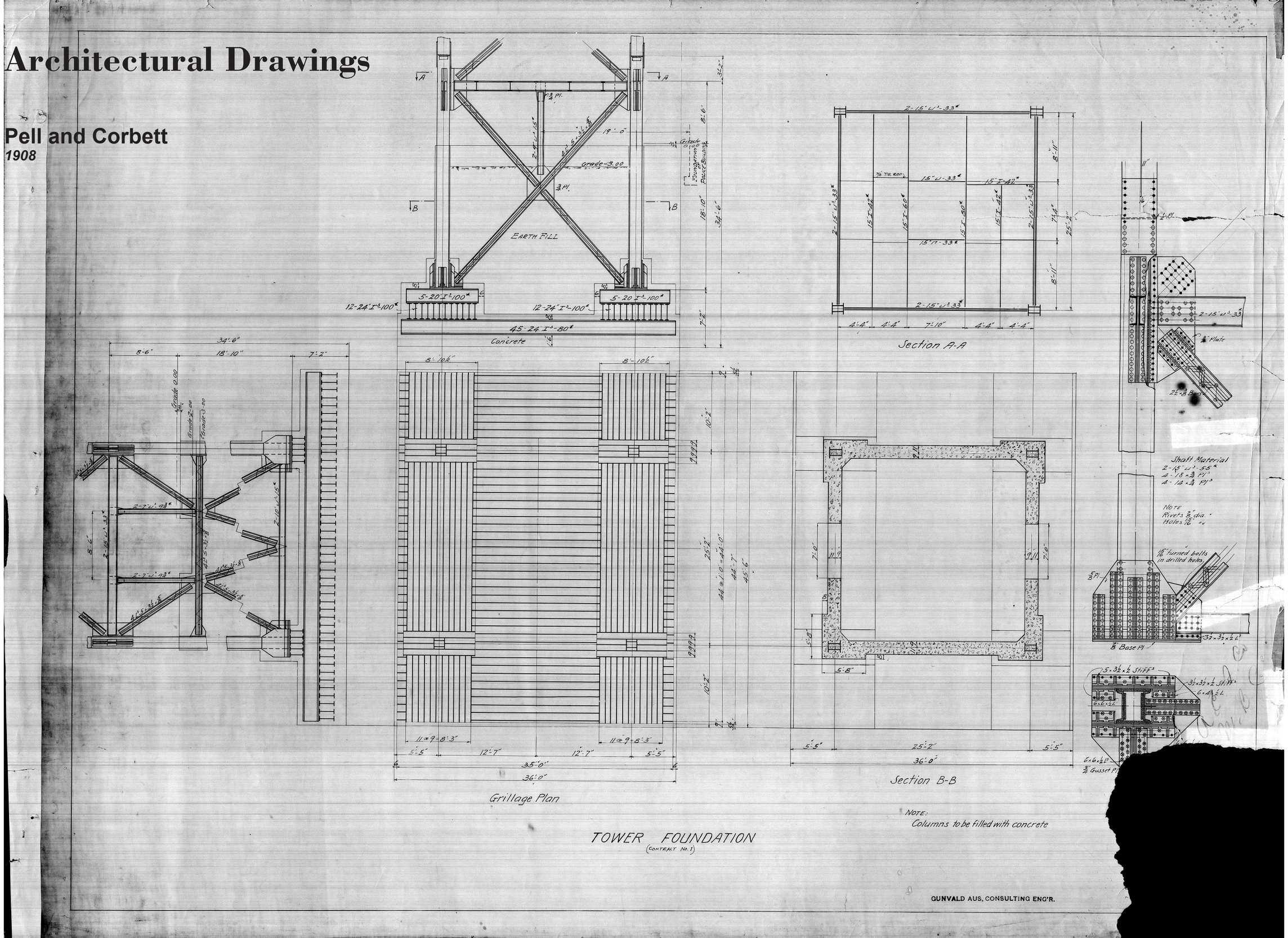


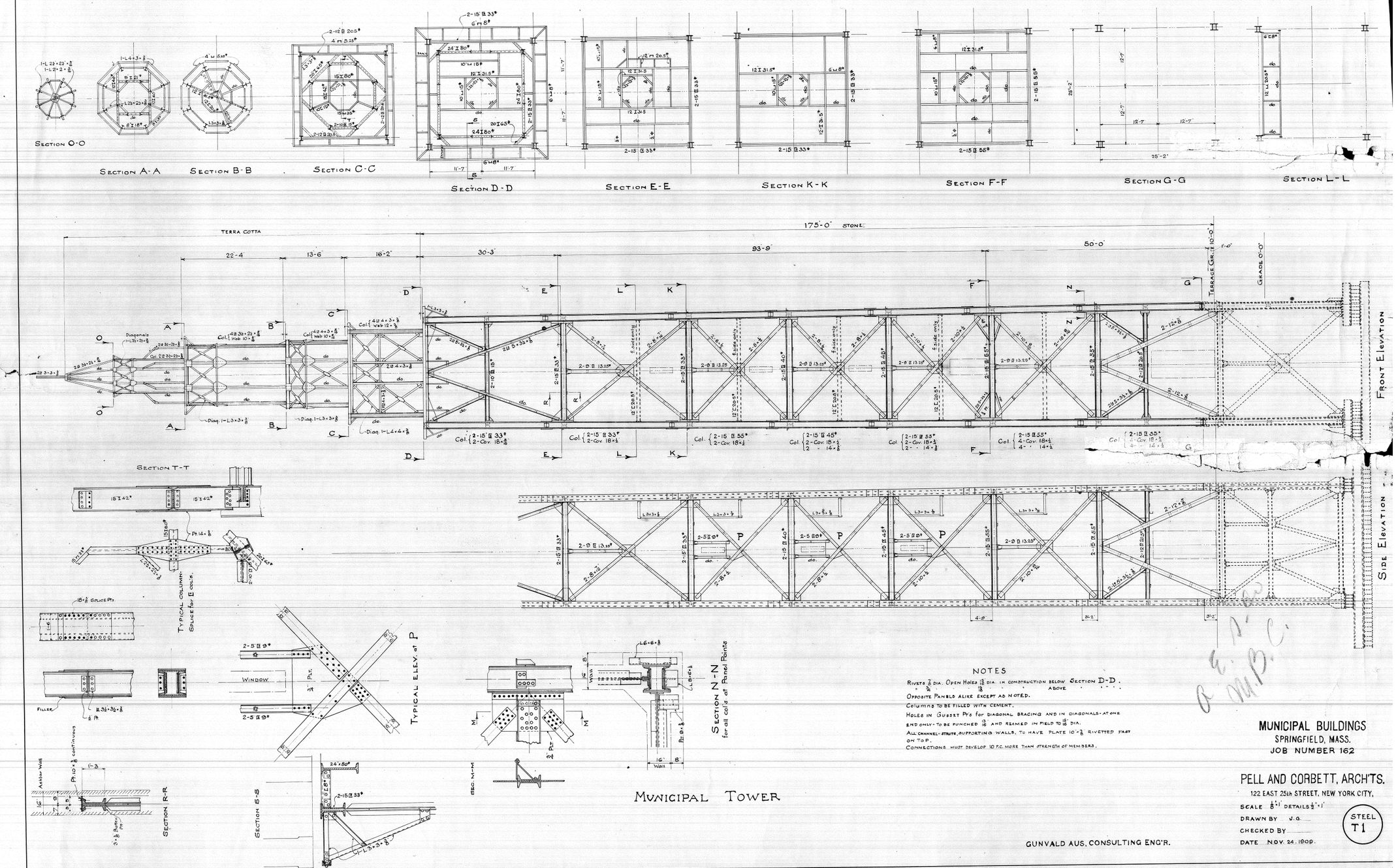
Image: Excerpt from Architecture, The Professional Architectural Monthly, June 1914

Bruner/Cott Architects

Architectural Drawings

Pell and Corbett
1908





NOTES

Rivets $\frac{7}{8}$ dia. Open Holes $\frac{15}{16}$ dia. in construction below Section D-D.
" $\frac{3}{4}$ " $\frac{13}{16}$ " " above " " " " .
Opposite Panels alike except as noted.
Columns to be filled with cement.
Holes in Gusset Pls for diagonal bracing and in diagonals at one end only - to be punched $\frac{13}{16}$ and reamed in field to $\frac{15}{16}$ dia.
All channel-struts, supporting walls, to have plate 10"×$\frac{3}{8}$ riveted fast on top.
Connections must develop 10 P.C. more than strength of members.

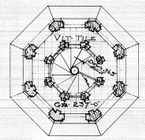
MUNICIPAL BUILDINGS
SPRINGFIELD, MASS.
JOB NUMBER 162

PELL AND CORBETT, ARCH'TS.
122 EAST 25th STREET, NEW YORK CITY.

SCALE $\frac{3}{8}$"=1' DETAILS $\frac{1}{2}$"=1'
DRAWN BY J.G.
CHECKED BY
DATE Nov. 24. 1909.

STEEL
T1

GUNVALD AUS, CONSULTING ENG'R.



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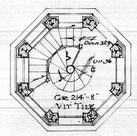

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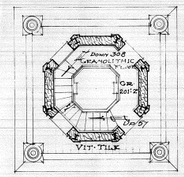

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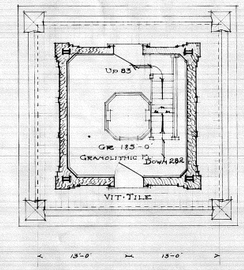

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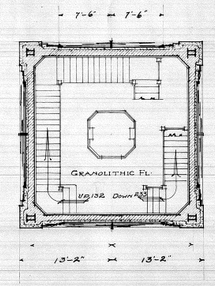

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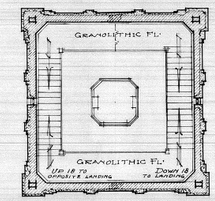
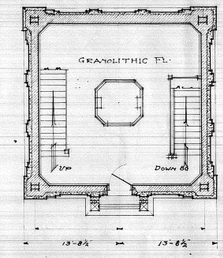


TYPE PLAN OF STAIR FROM (E) TO (F)



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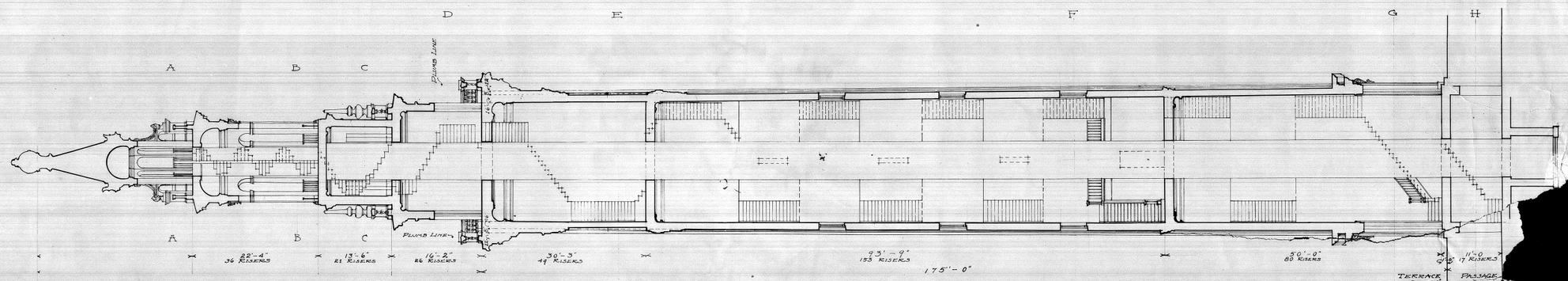
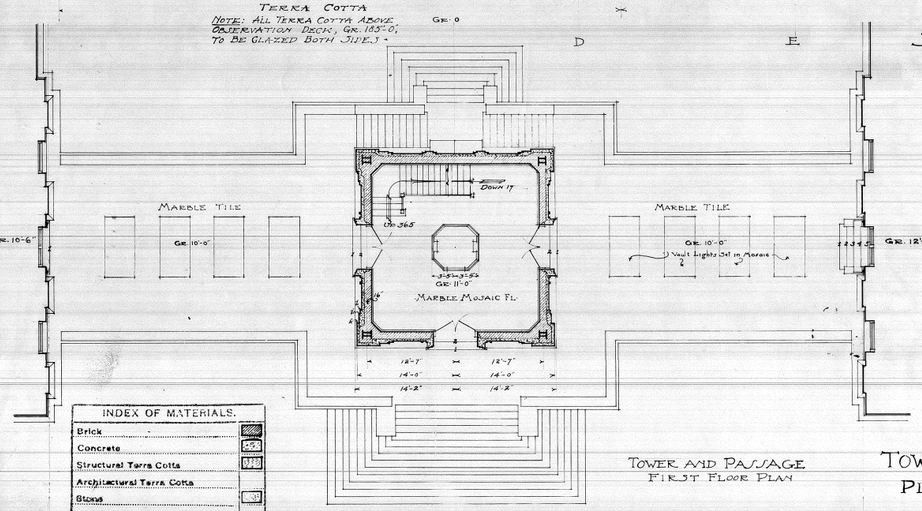


TERRA COTTA

NOTE: ALL TERRA COTTA ABOVE OBSERVATION DECK, GR. 183'-0", TO BE GLAZED BOTH SIDES.

SECTION ON AXIS 3



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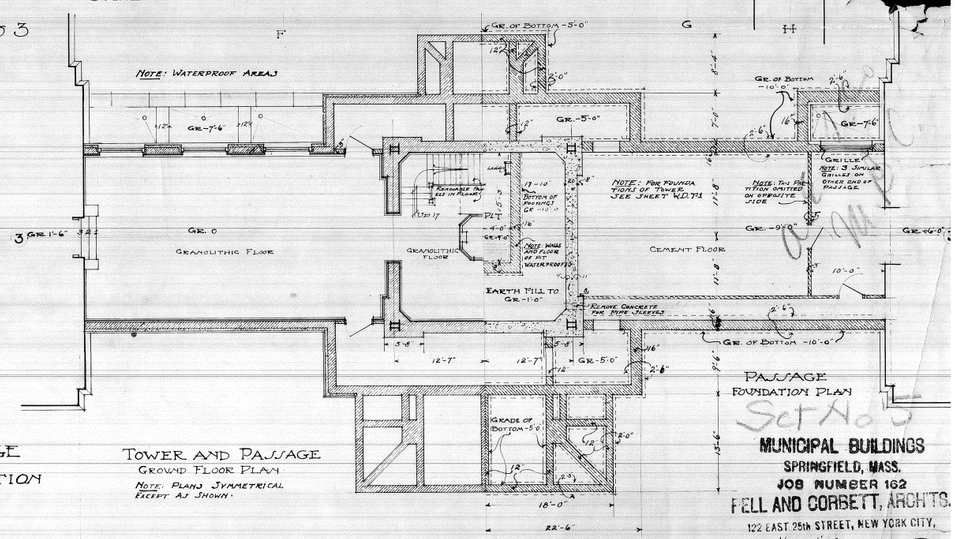
- Concrete
- Structural Terra Cotta
- Architectural Terra Cotta
- Stone

TOWER AND PASSAGE
FIRST FLOOR PLAN

TOWER AND PASSAGE
PLANS AND SECTION

REVISED
FOUNDATION PLAN OF TERRACE ADDED
C.W.S. Nov. 18. 09



TOWER AND PASSAGE
GROUND FLOOR PLAN

NOTE: PLANS SYMMETRICAL EXCEPT AS SHOWN.

PASSAGE
FOUNDATION PLAN

Set No. 3

MUNICIPAL BUILDINGS
SPRINGFIELD, MASS.
JOB NUMBER 162
FELL AND CORBETT, ARCHTS.
122 EAST 25th STREET, NEW YORK CITY.

SCALE 1/8" = 1'-0"
DRAWN BY C.W.S. 3/9
CHECKED BY
DATE 11/24/09

W.D.
T2

Sheet Sample
Tower and Passage Elevation
Section Thro' Terrace Looking Toward Tower
Section Thro' Terrace Looking Toward Auditorium
Terrace Rear Elevation
Waterproofed
Brick
Concrete
Gr. 10'-0"
Gr. 0'-0"
Gr. 8'-6"
Gr. 9'-0"
Gr. 10'-0"
Gr. 8'-6"
Gr. 0'-0"
Gr. 8'-0"
Gr. 9'-6"
Gr. 10'-0"
Gr. 0'-0"
Note: All Terra Cotta Above Observation Deck, Gr. 185'-0" To Be Glazed Both Sides.
Note: Heavy Ink Figures Are Those Which Are Included In This Contract.
Index of Materials.
Brick
Concrete
Structural Terra Cotta
Architectural Terra Cotta
Stone
Municipal Buildings
Springfield, Mass.
Job Number 162
Pell and Corbett, Archts.
122 East 25th Street, New York City.
Scale 1/8" = 1'-0"
Drawn by C.W.S.
Checked by
Date Nov 19. '09.
W.D.
T 3
Sheet 5

Editorial

***Architecture*, The Professional Architectural Monthly**
June 1914

ARCHITECTVRE

THE PROFESSIONAL ARCHITECTURAL MONTHLY

VOL. XXIX JUNE, 1914 No. 6

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EDITORIAL

LETTER FROM A MANUFACTURER'S REPRESENTATIVE REGARDING ARCHITECTS—BAD AND GOOD TASTE IN ARCHITECTURE

DEAR MR. FORBES:

In the April issue of ARCHITECTURE you have editorially raised a subject of more than passing interest, under the caption: "Letter From an Architect Regarding Manufacturers' Representatives." You have *not* asked me to write you my views, but I am wondering if, coming from the other side of the office screen, a few lines and a suggestion may not meet the appreciative interest of the man inside whose views are so tellingly and so kindly voiced in the article mentioned. To begin with, let me heartily endorse all that your correspondent has to say regarding the unfortunate and unintelligent methods of the average commercial salesman and the great handicap his ill-judged activities have created for the manufacturer who wishes to exploit his product on the higher plane of negotiation, which can alone command an architect's interest, confidence and respect. This side of the matter may all be summed up in the simple statement that the ends of art are sacred. The pushing and contentious salesman rarely appreciates that, and that he beats against something pretty well fixed and immovable when his product doesn't lend itself to their realization in a given instance. This broad general statement of the whole problem holds, with all due allowance for the prejudices and narrowness of mere precedent worship and other frailties of human nature in the make up of the average architect.

Now for the other side of the matter, in a simple suggestion of at least one little way in which the architect can do much to relieve some well-grounded criticism which exists among material-men and others upon whom fall the concrete realization of the architect's dreams. They *are* dreams and would remain so to the end of all time, but for the contribution which the material man, mechanic and contracting builder have made in the sum of the architect's practical knowledge, and in a very great degree, his artistic knowledge. Let our case go with *that*. The debt is written all over every building from the early ages of supreme architectural achievement down to the best of today, in every instance where the natural qualities of medium have been intelligently developed and used and the whole rings true, organically, as art.

With this reminder, let me suggest that, from the manufacturer's standpoint, there are too frequently lacking the elements of ordinary courtesy in the attitude of the architect's office toward visitors from the trade side; and this brings me to the question your correspondent raises of

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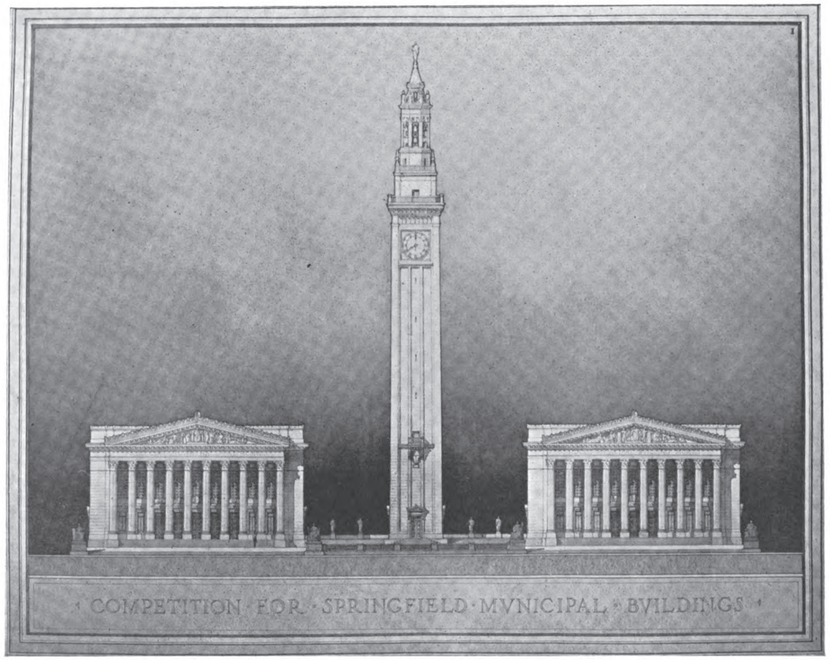


Elevation, showing proportion of winning partie.

COMMENT ON COMPETITIONS AND THE RESULTS OF ONE

BY HARVEY WILEY CORBETT

Mr. Harvey Wiley Corbett and his associate Mr. F. Livingston Pell were the successful competitors in the Municipal Group (Springfield, Mass.) Competition—The competition program drawn with Prof. Laird's usual thoroughness was a very complete contract in itself with the A. I. A. schedule of charges made a part of it.

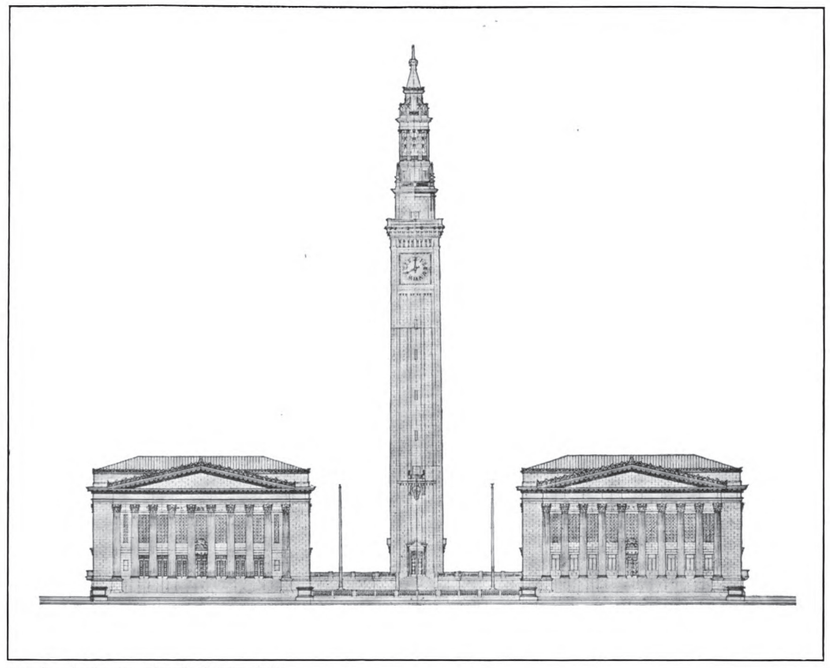
IS the competition a successful method of selecting an architect? This important question seems to be agitating the minds of both the profession and the laity, at least that portion of the profession which is after big work, and that portion of the laity which has it to give out. Of course, the young man wants the competition in order to get a chance at the job; the old man wants the job in order to keep ahead of the young man's competition. The successful competitor seldom has any complaint to make about the method of his selection, while the unsuccessful competitor seldom has anything else but complaint—and the return of his drawings. Each and every competition adds its quota of sadder and "sorer" ones, to that ever-increasing majority who bemoan the lack of taste and narrow viewpoint of the juries and who align themselves (for the moment at least) with the anti-competition group. But they nearly all prefer a competition if they can't have the work themselves by direct appointment, and so the competition, like the Mexican mix-up, will undoubtedly be with us for some time to come, and the question we must answer is not whether the competition is a good method for selecting an architect, but whether it is the right method of getting better buildings.

Perhaps, after all, this is only the same question differently expressed, for one thing is very evident, if the executed work, the finished building, the finally completed scheme in steel and stone, plaster and wood, if *that* is successful, then in that instance, at least, the method of selecting the architect was successful; if *that* is a failure, then the method was a failure. It makes little difference how much waste of energy there may have been on the part of the competing architects, or how many difficulties there were in the path of the successful one, if the results of competitions in general, considered from a broad point of view and upon a basis of fair average, are not as successful as work done by direct appointment, then we should all make some concerted effort to eliminate the system or change the method, but if the results of competitions average up to the standard of other work or possibly surpass it, then we should improve the method and enlarge the field so the community may benefit thereby. Particular instances of failure should not lead us to condemn the whole competition system, nor shining examples of success induce us to want all work competitive. "Results tell" in architecture as in everything else, and the only rational way to reach a satisfactory conclusion of this very vexing question is by a careful study of the results of competitions. Hoping that other architects may be induced to present with equal frankness the results of their own efforts in this line, I am here presenting the results of one competition, together with a brief outline of the progress of the work from the competition stage to completion,—a comparison in graphic form between the winning partie and the executed work, and comments on the reasons for the changes, points of interest in the construction, use of materials, etc., and the practical value of the completed group from the point of view of owners, workers and the public.

The Springfield Municipal Group was the outcome of a competition conducted under the auspices of the Municipal Building Commission of Springfield, Mass., with Prof. Warren Powers Laird of the University of Pennsylvania as professional adviser. Competitors were chosen in a preliminary "open stage" to join with others especially invited in a "final stage." The award was made in October, 1908, and a contract between architects and owners signed a few months later. The usual thoroughness with which Prof. Laird had drawn his competition program made this feature of the work comparatively simple, the competition program being a very complete contract in itself, with the American Institute of Architects' schedule of charges made a part of it. The architectural adviser was named as arbiter in case of any disagreement during the competition or later and this condition proved a valuable asset both to owners and architects in at least one instance during the progress of the work. In fact, the competition program, together with the winning design, was found to be a most satisfactory basis of operations during the entire development of the project. Certainly, from this point of view, a properly conducted competition places the architect in an enviable position, which means a large saving in energy that would otherwise be expended in producing and discussing a great variety of schemes and solutions.

An interesting condition of the contract was, that the architects could be dismissed upon payment of a stated sum if the contract for the complete group of buildings could not be let within the cost price, $1,000,000, including all fees of architects and experts but excluding furniture, fixtures and decorations. This condition provided further that the working plans should not be essentially different from the competition drawings and yet that they should include such minor changes as had resulted from changed conditions since the competition program had been prepared. This imposed on the architects a strict condition of economy in regard to the development of their project that was quite as irksome as any conditions ever imposed by the "direct appointment" client.

In November, 1909, the contract for foundations of the auditorium and tower was awarded, and in January, 1910, contracts were let for the balance of the work at a



Elevation, showing proportion of buildings as built.

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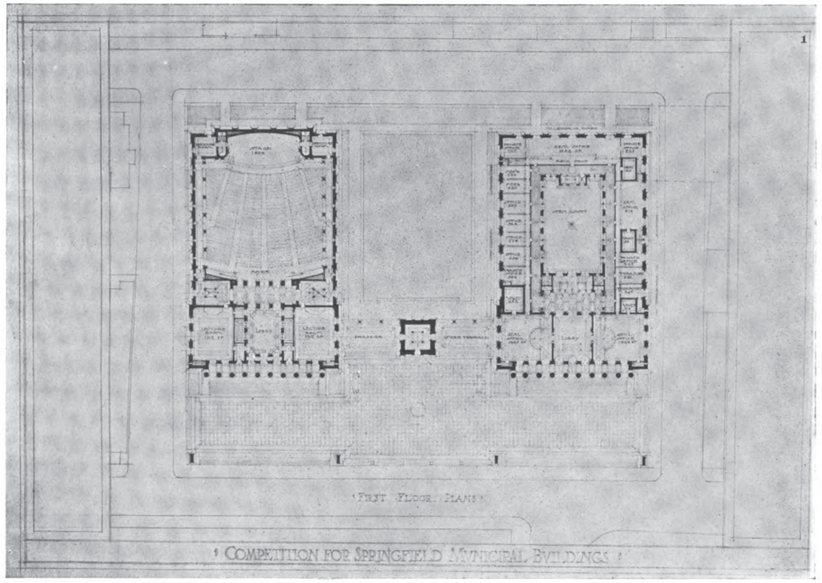

Plan of winning partie.

total figure well under the limit set by the Building Commission.

During this time, which was necessary for the preparation of the working drawings, considerable opposition developed to the expenditure of such a sum of money in a municipal group for a city of only 90,000 inhabitants. The proposed location was questioned, other sites by many considered more desirable. The scheme of the buildings was severely criticised, the fact that the tower served no practical purpose except as a place for clock and chimes and observation stage was strongly urged as a reason for dropping the whole project. Cartoons appeared in which the buildings were caricatured as the "Greek twins with their nursing bottle," and altogether the architects found themselves in the midst of a little local mixup that required the development of some particular talents not learned in making water-colors or in reading the history of architecture as a fine art. Public hearings were held and we were called upon to answer a running fire of questions, ranging all the way from the quality of building sand to the advertising possibilities of a town hall.

The scheme of the group was, of course, largely the result of the competition requirements. The two elements, auditorium and municipal offices, were to face the square and have some sort of a tower (evidently reminiscent of the tower on the original city hall which had been destroyed by fire). Although it was not required to place these elements in one building, the winning design was distinctive in separating them completely. Naturally much was gained by this, both in simplicity of plan arrangement and expression of purpose of each particular feature.

All important pieces of work are the result of many personalities working in accord, under the leadership of some dominating personality. In this particular case the Chairman of the Building Committee, Mr. George Dwight Pratt, was the dominating personality. A man of rare culture, independent means and large interests, he served his city as a chairman from the very inception of the building idea to the final dedication of the group, gave his time, energy and talents and all without compensation of any sort. Through his efforts the competition was instituted in the first place, Prof. Laird engaged as adviser, the city's agreements lived up to in spite of all opposition, and the buildings brought to their final completed stage.

The first change from the competition layout came with the location of the buildings. A city building, the police department, occupied one portion of the site and had to be left undisturbed pending the completion of new quarters in another part of the square. Therefore the group was built one building at a time, or rather the auditorium and tower were built first and the municipal office building later. This process just doubled the time necessary for the work of construction, necessitated shifting the whole group to the left and required the cutting of a new street on that side which, by the way, is still to be done. The buildings face an open square, the original town centre of old Springfield. A very attractive Colonial Church with a pedimented portico and steeple of quaint design and proportion still stands in this square but is ultimately to be moved to a new site leaving a clear space from Main Street to the river, with public buildings facing both sides of it.

The second change was to raise the base line of the entire group so as to bring the basement story to grade level, to take more space between the curb and the front of the

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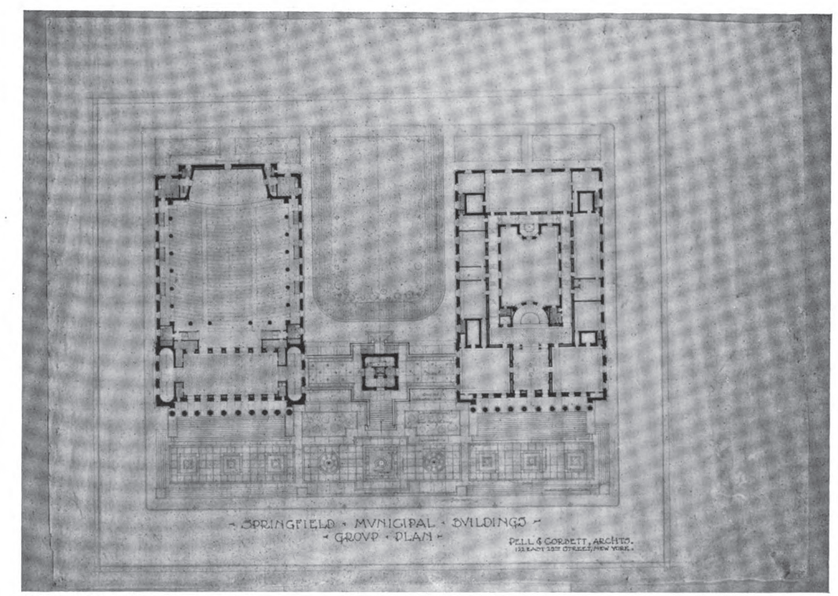
buildings, and to give a more imposing flight of steps in the approach to the group.

The next important change from the competition drawings was in the auditorium where the small lecture rooms near the front of the building were eliminated and the stage at the rear extended so as to give a maximum seating capacity of 4,500. An exhibition hall equal in area to the floor of the auditorium itself was built in the basement and connected by numerous stairs at the sides, which, from a landing at grade level, provide exits for both halls. A great hydraulic lift about one-third the area of the stage and big enough to take the largest automobile, connects to two levels with the rear central entrance so both halls can be used as exhibition rooms for industrial fairs, etc.

In the case of the municipal office building it was necessary to secure more office space as soon as the distribution of rooms to the various departments was taken up and so the rear portion was widened, and an attic story not called for in the program was added. In fact, the makers of the competition program had looked ahead as far as they dared, and yet the growth of the city and its civic needs were such that every inch of available space in the enlarged building was snapped up by the various city departments long before the building was complete. One can imagine the difficulty that would have arisen had not some one of Prof. Laird's wide experience and technical skill been the guiding factor in the original layout of requirements. When the "directly appointed" architect has such a problem, it is hard for his clients to regard his suggestions of building for the future as disinterested, since he is to benefit apparently as much as any one by the expansion.

Another interesting change from a purely architectural point of view occurred in connection with the tower. The construction of this was "steel skeleton frame," while the buildings were "wall bearing." When the steel frame reached a point level with the first landing stage, i. e., the top of the plain shaft, the silhouette of the steel work gave a fairly accurate idea of the finished mass of that portion of the structure. We, as architects, decided that the tower was not high enough. In fact, the foreshortening seemed so great that one could not believe but that some mistake had been made in the steel work. We had, of course, studied this particular feature from every angle of elevation, diagonal, and perspective drawing. We had given a great deal of time to critical study of towers both here and abroad. However, the steel silhouette was not satisfactory and we determined, after very careful consideration of the matter and the making of many more studies, to recommend an increase in the height of the tower of 25 feet at an estimated cost of about $15,000. We had little difficulty in persuading the commission to accept our suggestion, thanks to Mr. Pratt's quick appreciation of any improvement of an architectural nature. This increase in height was made partly in the plain shaft and partly in each of the stages above.

An examination of the competition elevation and the line drawing of the elevation as built, shows the effect of these various changes. The comparison is interesting because, I believe, every change made has added greatly to the architectural value of the executed work, and yet I doubt if any of them would be suggested as desirable changes in the proportion or silhouette of the original drawing. In plan arrangement, on the other hand, I believe nearly every change would have resulted directly from a longer study



Plan of buildings as built.

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of the plan, per se, while the gain in simplicity and proportion are self evident. This question of the relation of competitive drawings to executed work is the most interesting phase of the competition question, and one that certainly demands careful consideration on the part of advisers in selecting competitors and juries in deciding competitions.

The buildings are fireproof throughout. The exterior is limestone with all ornamental work in terra cotta to match. Roofs are of tile and copper. The interior finish is simple except in public spaces and special rooms. Here marbles, fine woods, ornamental and decorated plaster have been used as the particular purpose of the spaces seemed to suggest. The A. E. Stephens Co., the builders, deserve particular mention for the workmanlike execution of their part, a matter of great importance to the architects, since so much of the success of any project depends upon its execution.

The original contract included only a durable interior finish with some ornamental work in the public spaces. but as the buildings progressed and time arrived for work to commence on the interiors, the impression created by the exterior had been so satisfactory that it was determined to carry out the interior in a manner more in keeping with the general character of the Group. Apparently the opposition to the project which had existed in the minds of some of the citizens of Springfield while the scheme was still on paper, entirely vanished when they were able to get a clearer idea of the completed work. Additional contracts amounting to $350,000 were awarded for this elaboration of the interior. The entrance doors of both buildings and tower were changed from wood to bronze with historic sculptured panels in the center door of each. Some additional changes were made in the terrace approaches, flag poles were added as a feature of the forecourt and planting of trees, shrubs and lawn completed the work.

In December, 1913, the entire Group was officially dedicated with festivities extending over two days. Ex-President Taft was the guest of honor, an especially designed medal was struck to commemorate the occasion, a dinner was given in the reception room of the auditorium to all those who had had any connection with the work, whether professional, official or constructive, and the buildings were opened to the public for inspection. All city departments were installed in their new quarters and special exhibitions were given by some, notably the department of education. A grand ball in the auditorium on the evening of the second day wound up the affair.

The auditorium had been opened the previous February with a musical program given by the Philadelphia Symphony Orchestra. An auditorium (as its name suggests) is a place to hear in. The practical value of the building depends on this one thing. No matter how many beautiful columns on the front or how many plush seats on the inside, it is a failure if acoustically wrong. As architects, we gave this question very serious study, first as to the proportion of the hall, then as to the form of wall surfaces, and finally as to materials of the walls themselves. Fortunately the acoustics proved to be perfect for orchestral work as well as for singing and speaking, with the result that the building has been in almost continual use ever since its opening and scores of people, qualified to speak on such matters, have expressed their appreciation of its remarkable acoustic properties.

The practical working value of the municipal office building is not so easily determined, unless we judge from the plan which shows a building of direct and simple circulation, good natural light in every corner including hallways and specially featured rooms where the public work of the city government is carried on. Once these broad principles of plan have been determined (and that is about as far as a competition jury should carry their criticism of plan arrangement) the question of practical convenience is largely a matter of furniture and fixtures. This was planned out by an expert in such matters, Mr. Thomas Bruce Boyd, whose business it is to do only that work. The unqualified expressions of satisfaction on the part of the workers in the building is sufficient evidence of success of both plan arrangement and furniture equipment.

As to the practical value of the tower: the clock tells the time, the chimes ring, and the elevator carries visitors to the observation landing free of charge. A great deal might be said on the question of its architectural proportion and its esthetic value as the marking point of Springfield's civic center, and much could be written on some of the discrepancies we discovered between the drawings and the effect of executed work as regards matters of proportion and mass. Still more might be said upon that very disturbing topic, the relation of competition drawings to executed work and just how far those drawings ever express their author's ability to carry out successfully in the round what has been so beautifully presented in the flat. As a matter of fact, if we want better buildings, should not competition be limited to men whose *executed work* has proved them capable artists? Will juries ever be expert enough to "spot" the *tricks* of the "projet"? These and many other questions could be asked and answered, but this is not the occasion for such a discussion. The results of one competition are presented for what they are worth. Testimonials from satisfied citizens will not prevent my architectural "confrères" from "ripping the design up the back" if they want to.

THE GEORGE WASHINGTON MEMORIAL

The Designs and Plans of Tracy & Swartwout (placed I) and of Electus D. Litchfield.

TRACY & SWARTWOUT'S successful design in the competition for the George Washington Memorial Building at Washington, D. C., presented in this issue, is extremely interesting, not only from the exterior viewpoint as a stately and dignified architectural monument, but from the fact that, as the main feature of the building was an enormous auditorium, it was conceived as an auditorium, and not simply as a huge hall.

Of course, as the name signifies, an auditorium is a place in which to hear, but anyone who has had the fortune, good or bad, to attend a convention in any of the larger auditoriums of the country know that whatever other merits they may have, the acoustics are abominable.

Until within a comparatively few years, the science of acoustics was, at best, but a half opened book, but the careful study of a few men has now had wonderfully successful results, and proper acoustical qualities can be designed for with a certainty of success.

The architects tell us that their first step in this com-

(Continued page 134)

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MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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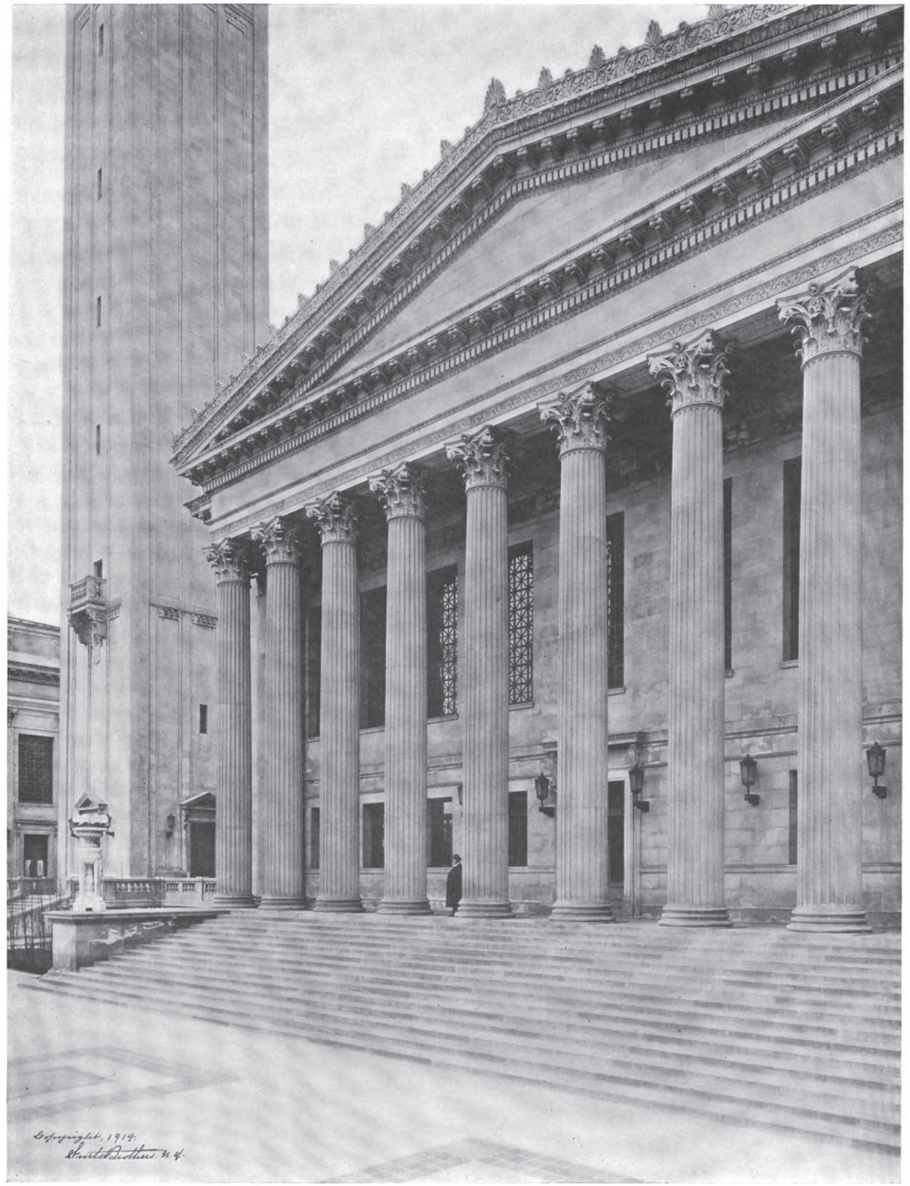

FAÇADE, OFFICE BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS.
F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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DETAIL, CAMPANILE, MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS

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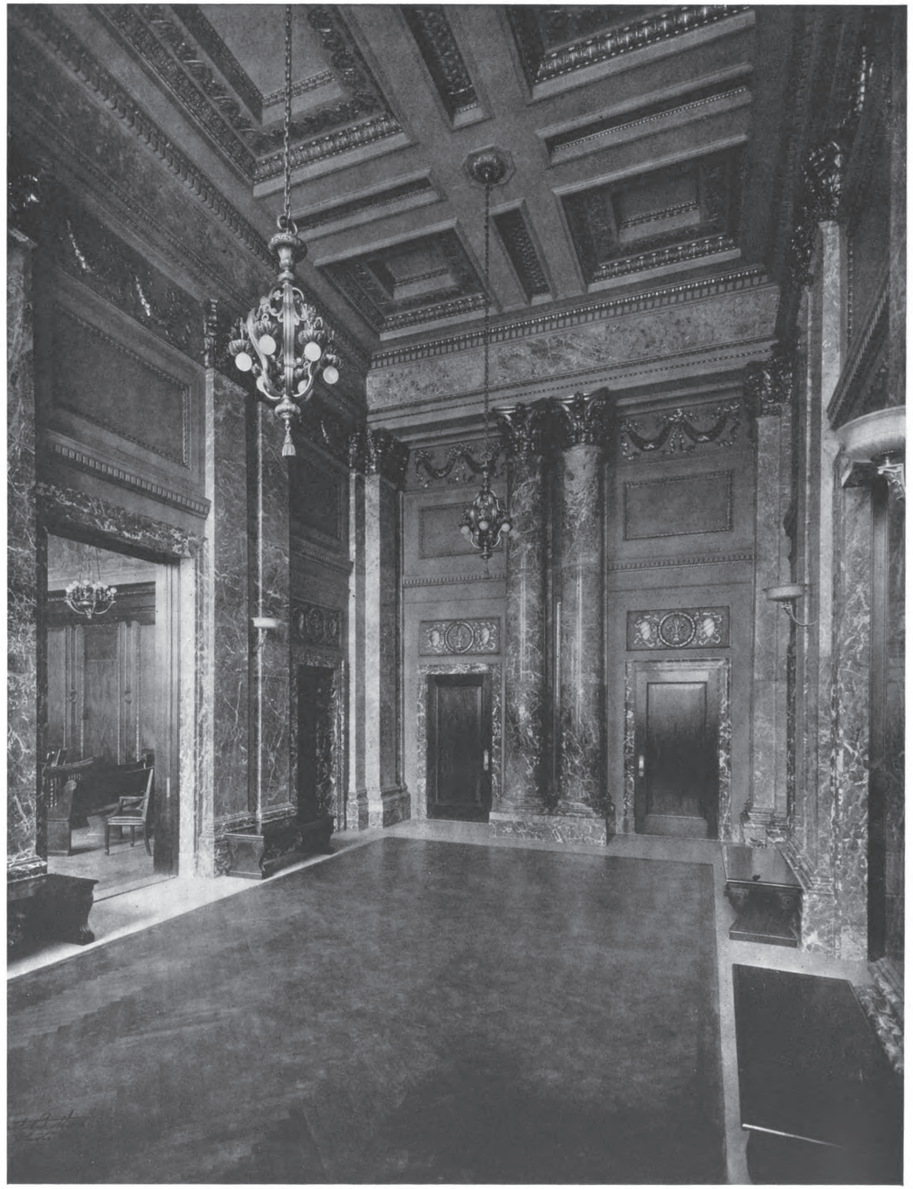

MEMBERS' LOBBY, OFFICE BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS.
F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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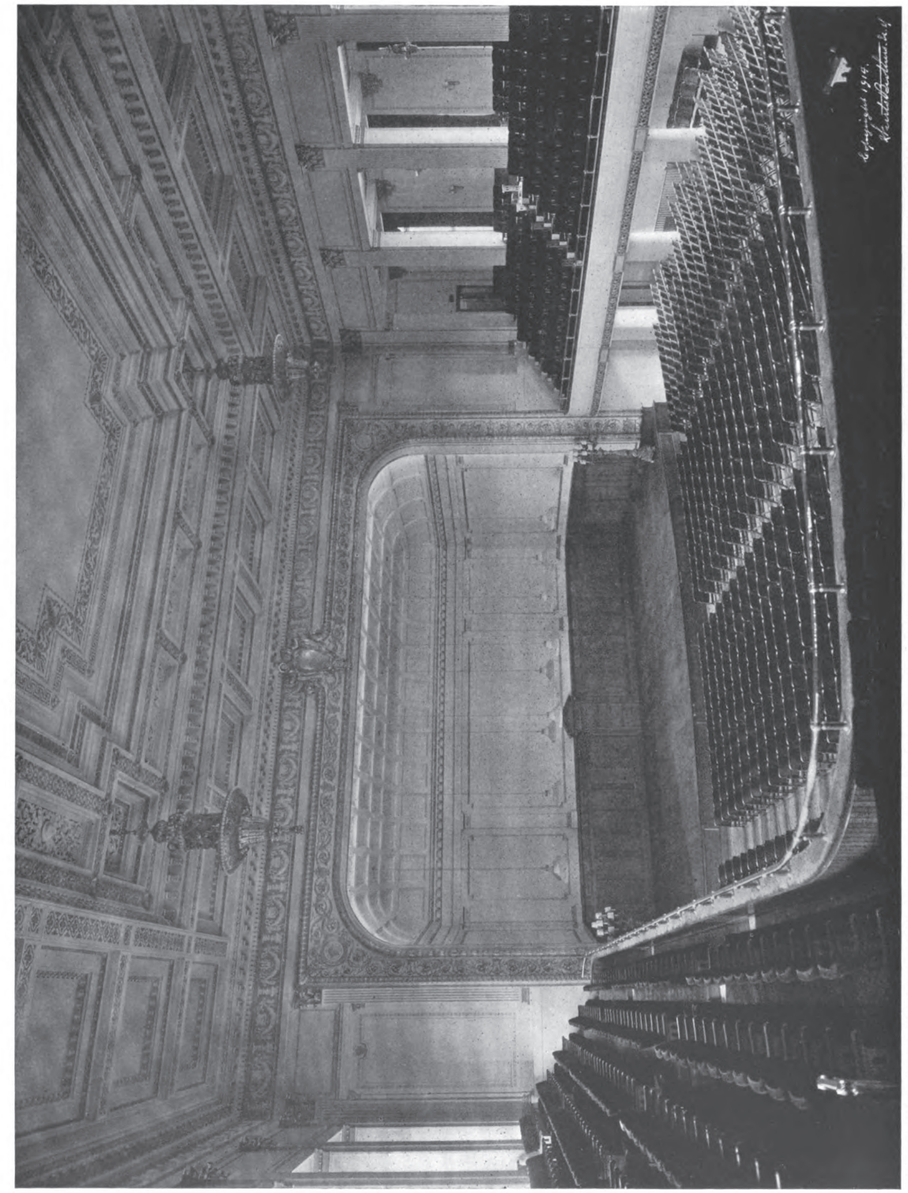

AUDITORIUM, AUDITORIUM BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS.
F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS

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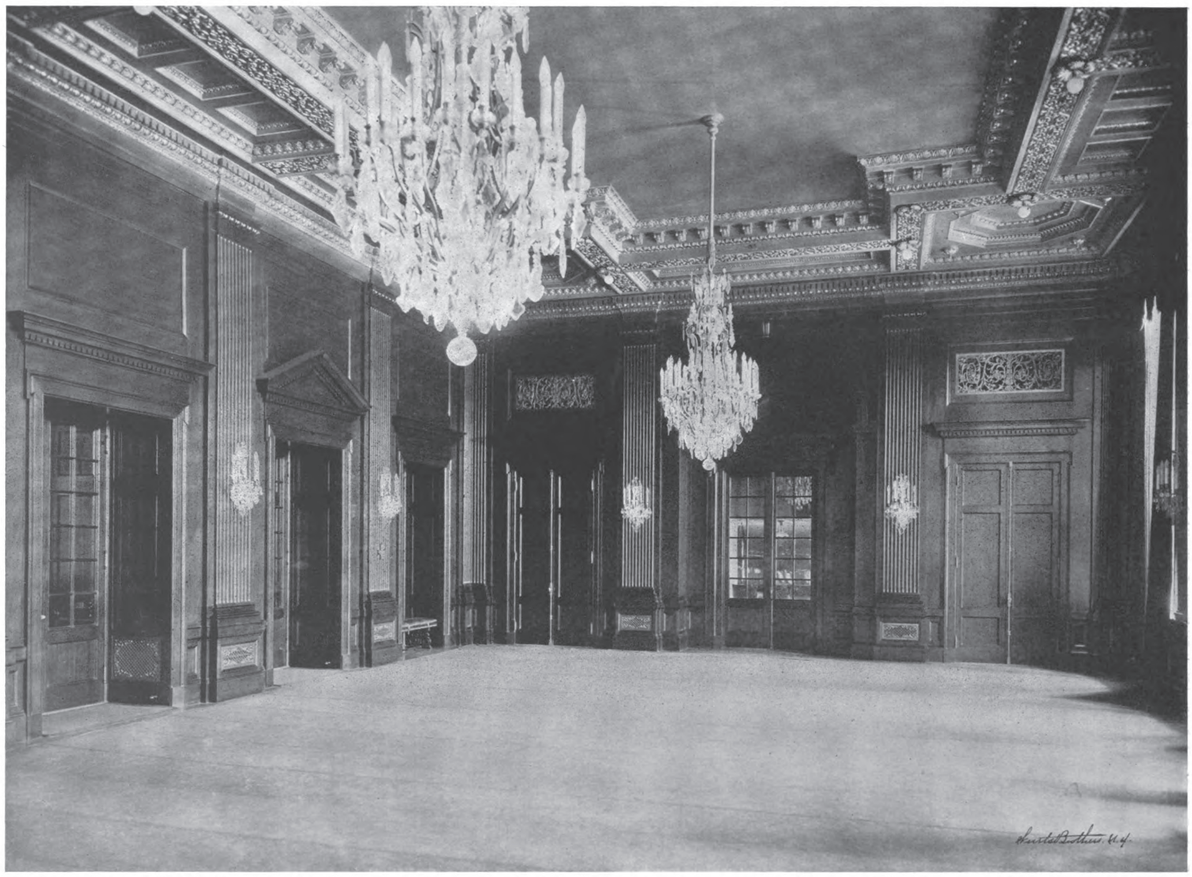

RECEPTION ROOM, AUDITORIUM BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W CORBETT, ARCHITECTS.

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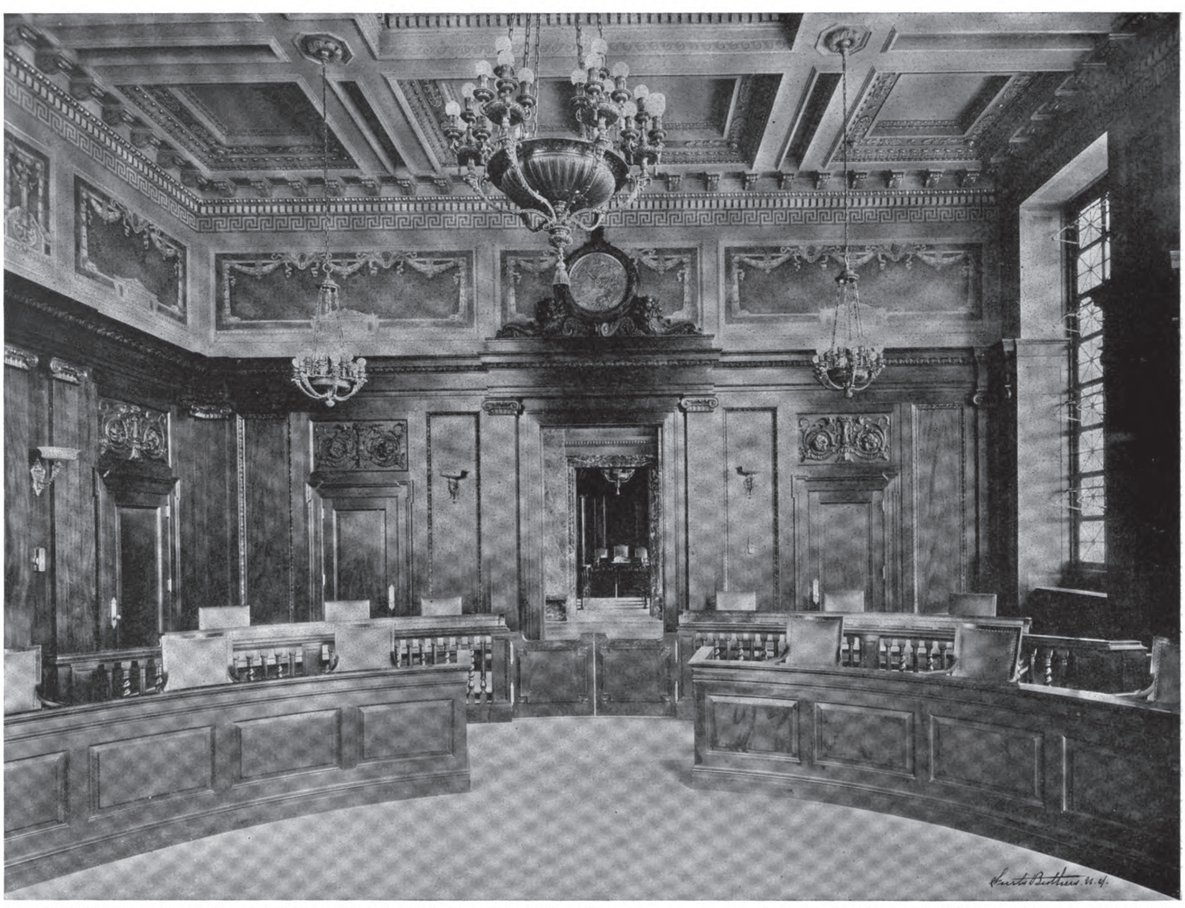

ALDERMANIC CHAMBER, OFFICE BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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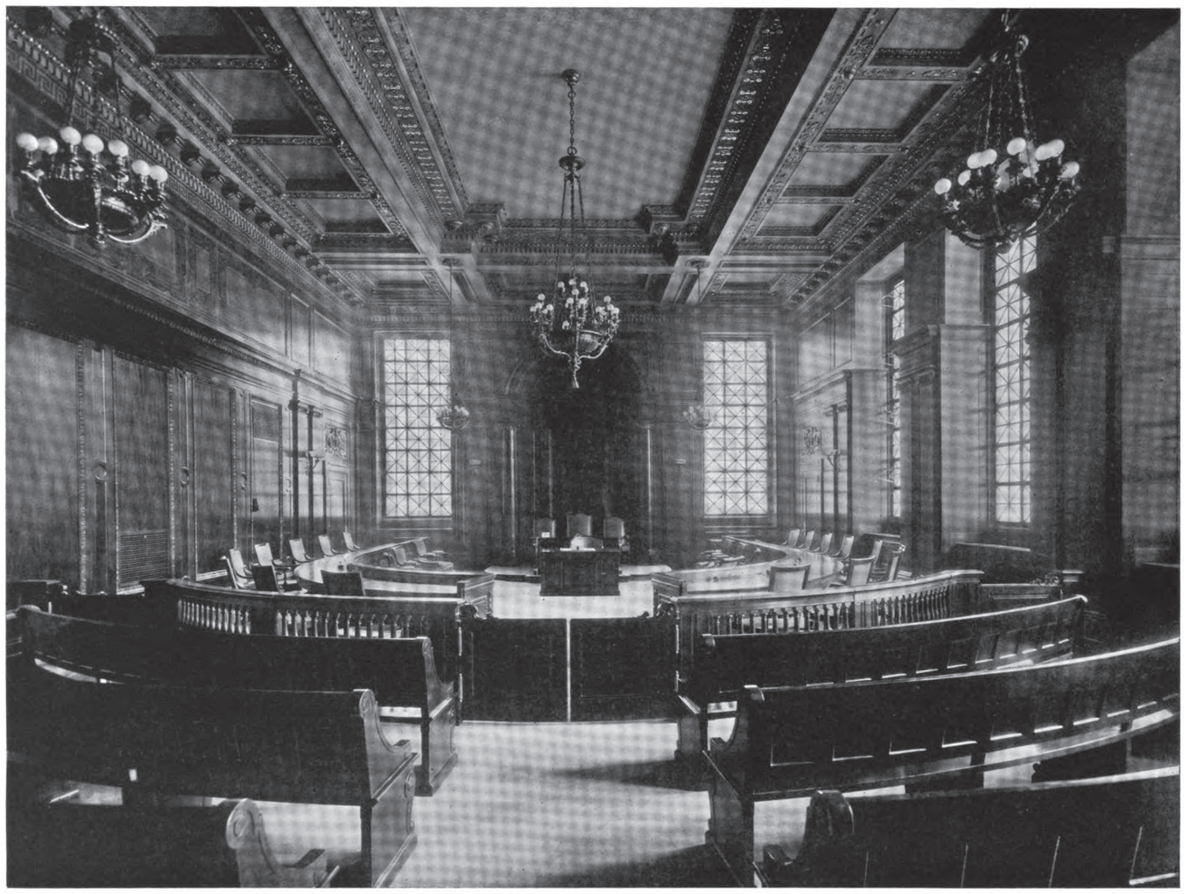

COUNCIL CHAMBER, OFFICE BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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MAYORS' OFFICE, OFFICE BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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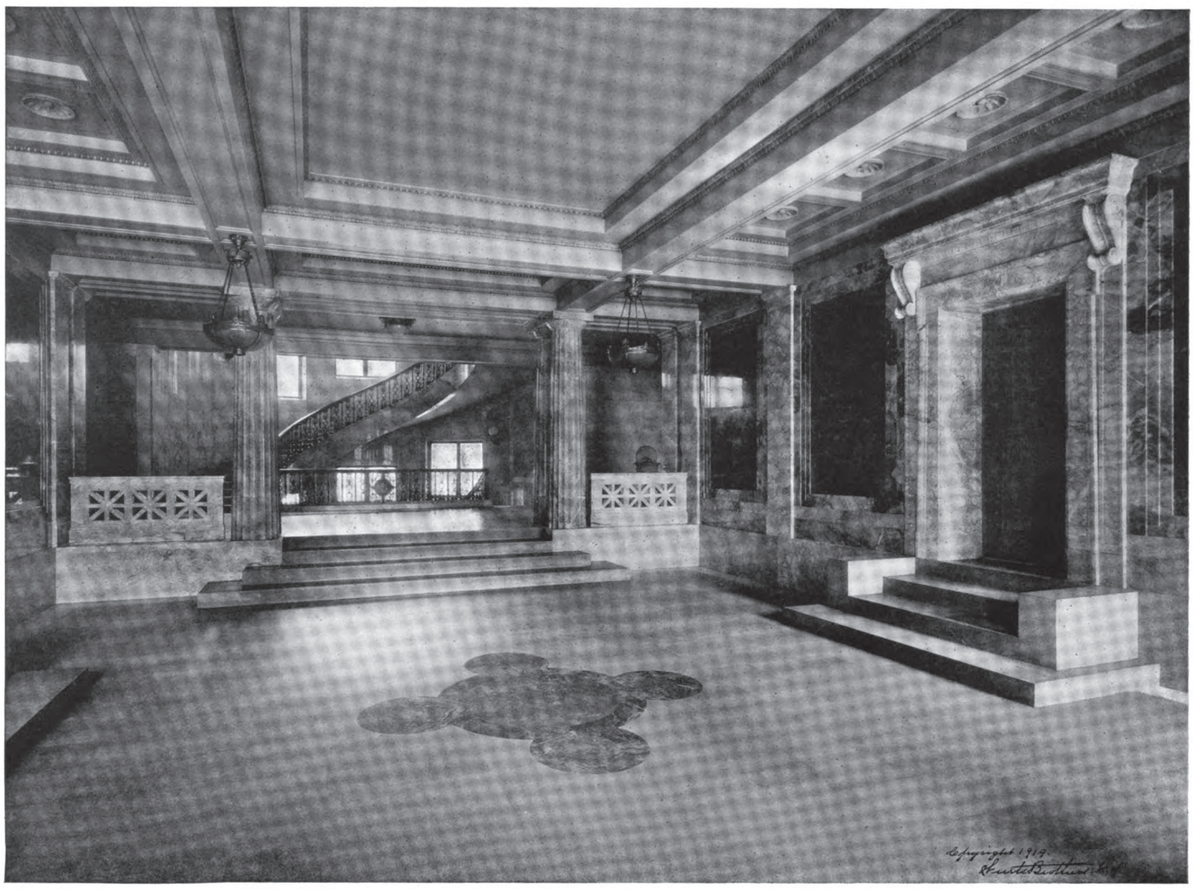

ENTRANCE LOBBY, OFFICE BUILDING, MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS

Brunner/Cott Architects

-A.201-

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Doorway, Office Building. Gail Sherman Corbett, Sculptor

Doorway, Campanile. Gail Sherman Corbett, Sculptor.

DETAILS, MUNICIPAL GROUP, SPRINGFIELD, MASS. F. LIVINGSTON PELL, HARVEY W. CORBETT, ARCHITECTS.

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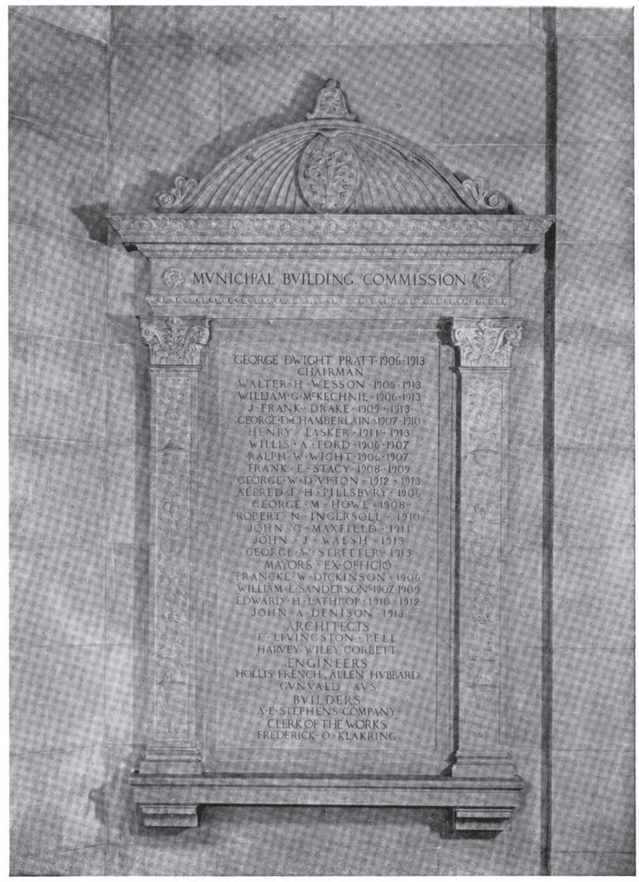
Brunner/Cott Architects

Pedestal Lighting Fixture.



Tablet.

DETAILS, MUNICIPAL GROUP, SPRINGFIELD, MASS.

F. LIVINGSTON PELL, HARVEY W CORBETT, ARCHITECTS.

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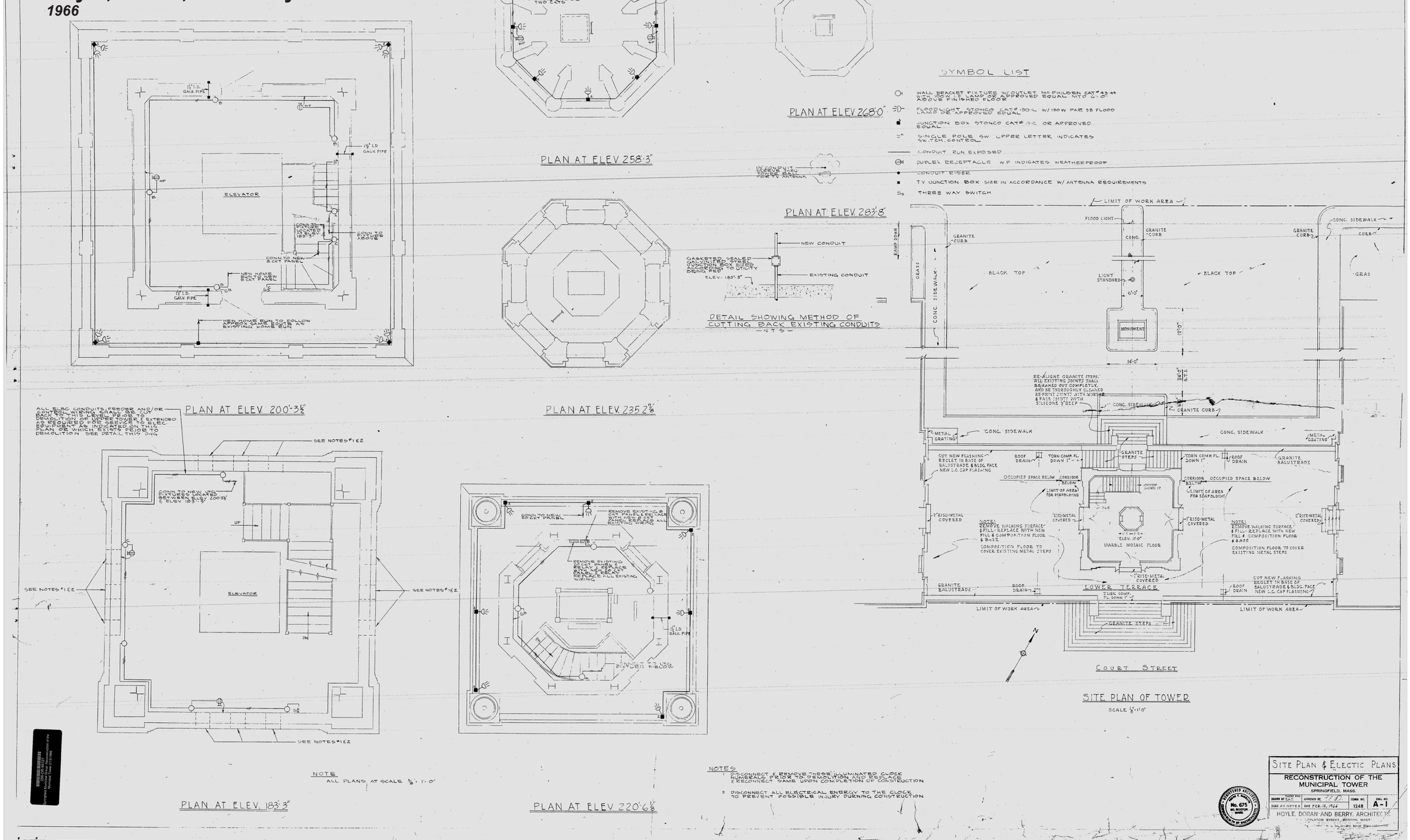
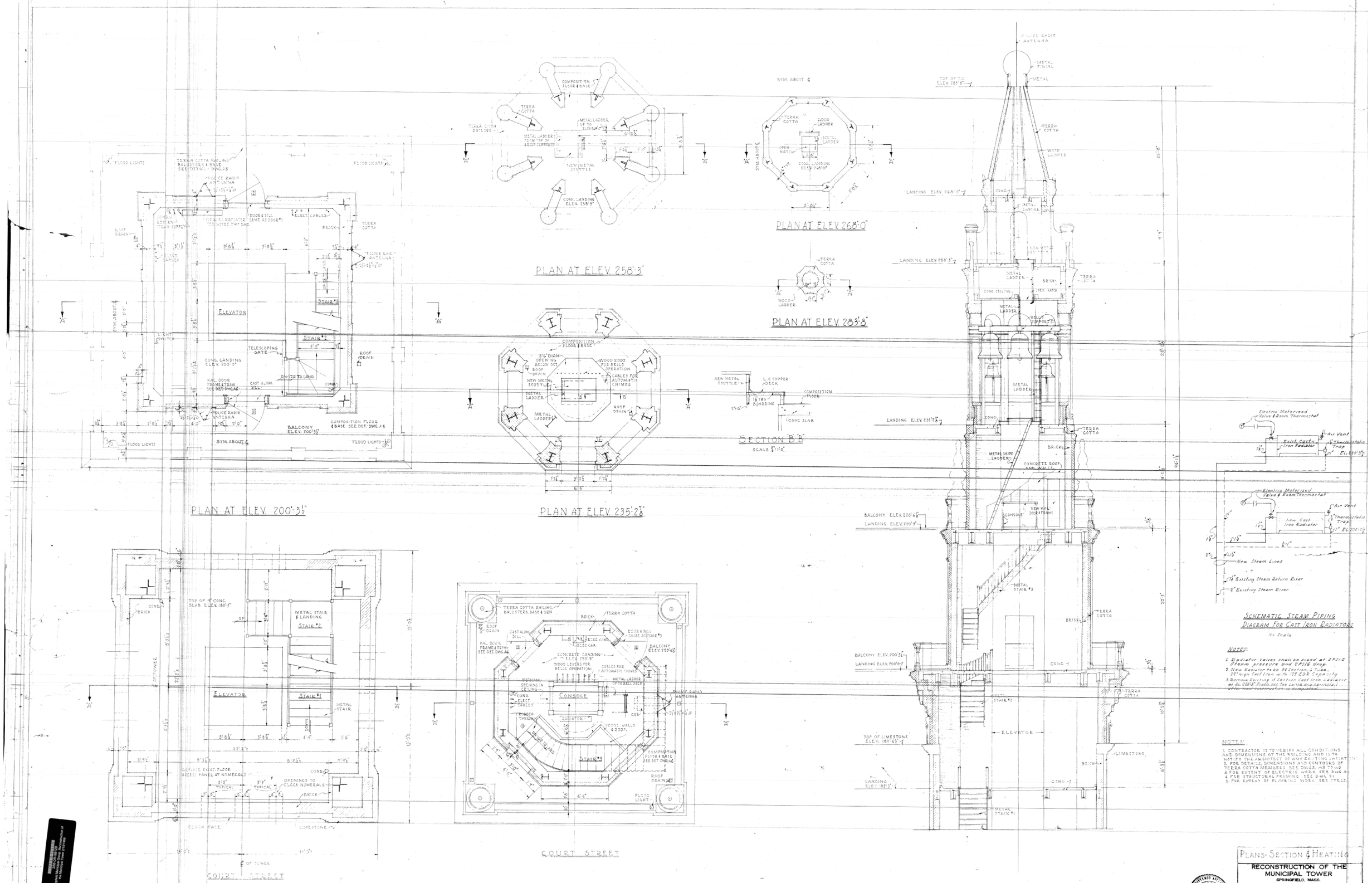
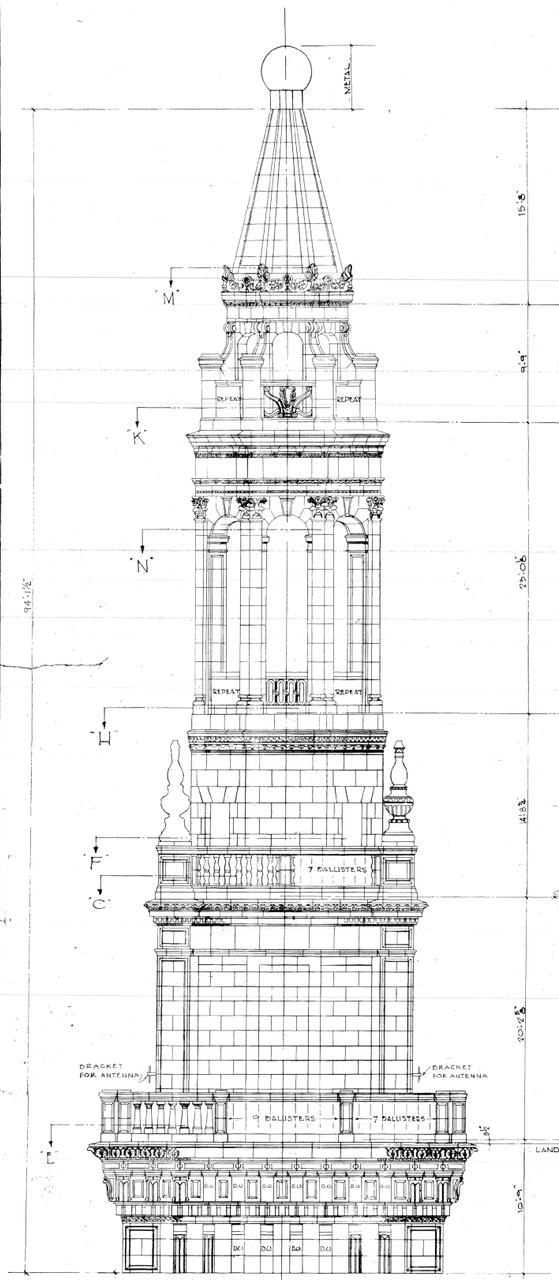
Architectural Drawings

Hoyle, Doran, and Berry Architects

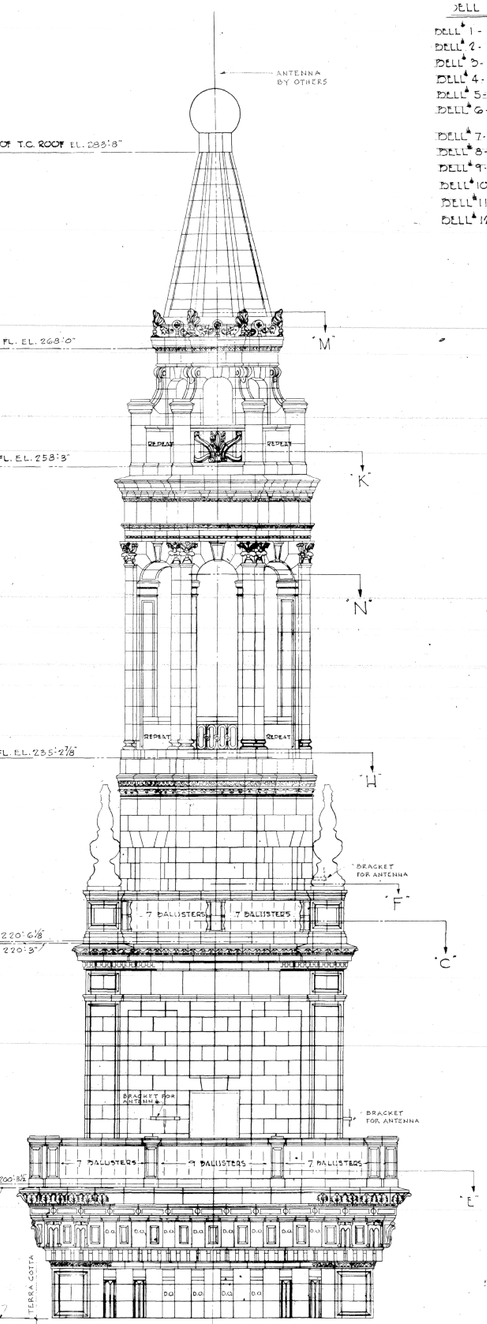
1966




PLAN AT ELEV. 200'-3½"
PLAN AT ELEV. 235'-2⅞"
PLAN AT ELEV. 258'-3"
PLAN AT ELEV. 268'-0"
PLAN AT ELEV. 283'-8"
SECTION "B-B"
SCALE ⅛"=1'-0"
SECTION "A-A"
SCALE ⅛"=1'-0"
PLAN AT ELEV. 183'-3"
PLAN AT ELEV. 220'-6⅛"
COURT STREET
NOTE: ALL PLANS AT SCALE ⅛"=1'-0"
ELEVATOR
STAIR #1
STAIR #2
STAIR #3
METAL STAIR
CONSOLE
POLICE RADIO ANTENNA
TERRA COTTA
BRICK
LIMESTONE
CONC.
ROOF DRAIN
FLOOD LIGHTS
SYM. ABOUT ℄
℄ OF TOWER
Schematic Steam Piping Diagram For Catt Iron Radiators
No Scale
NOTES:
1. Radiator valves shall be sized at 4 P.S.I.G. Steam pressure and 8 P.S.I.G. drop.
2. New Radiator to be 38 Sections, 4 Tube, 32" high Cast Iron with 125 E.D.R. Capacity.
3. Remove Existing 15 Section Cast Iron radiator as No. 2018 Sheets set for Carts and connection stubs must remain for re-use.
NOTES:
1. CONTRACTOR IS TO VERIFY ALL CONDITIONS AND DIMENSIONS AT THE BUILDING AND IS TO NOTIFY THE ARCHITECT OF ANY EXISTING VARIATIONS.
2. FOR DETAILS, DIMENSIONS AND CONTOURS OF TERRA COTTA MEMBERS SEE DWGS. A8 TO A16
3. FOR EXTENT OF ELECTRIC WORK SEE DWG. A1
4. FOR STRUCTURAL FRAMING SEE DWG. S1
5. FOR EXTENT OF PLUMBING WORK SEE DWG. P1
PLANS-SECTION & HEATING
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.
DRAWN BY E.A.T.
APPROVED BY
CONTR. NO. 1248
DWG. NO. A-2
SCALE AS NOTED
DATE FEB 15 1940
HOYLE, DORAN AND BERRY, ARCHITECTS
240 BOYLSTON STREET, BOSTON, MASS.
CONTRACTOR TO CHECK ALL DIMENSIONS AT THE BUILDING BEFORE COMMENCING WORK
REGISTERED ARCHITECT No. 6774 BOSTON MASS.
COMMONWEALTH OF MASSACHUSETTS



SIDE ELEV.

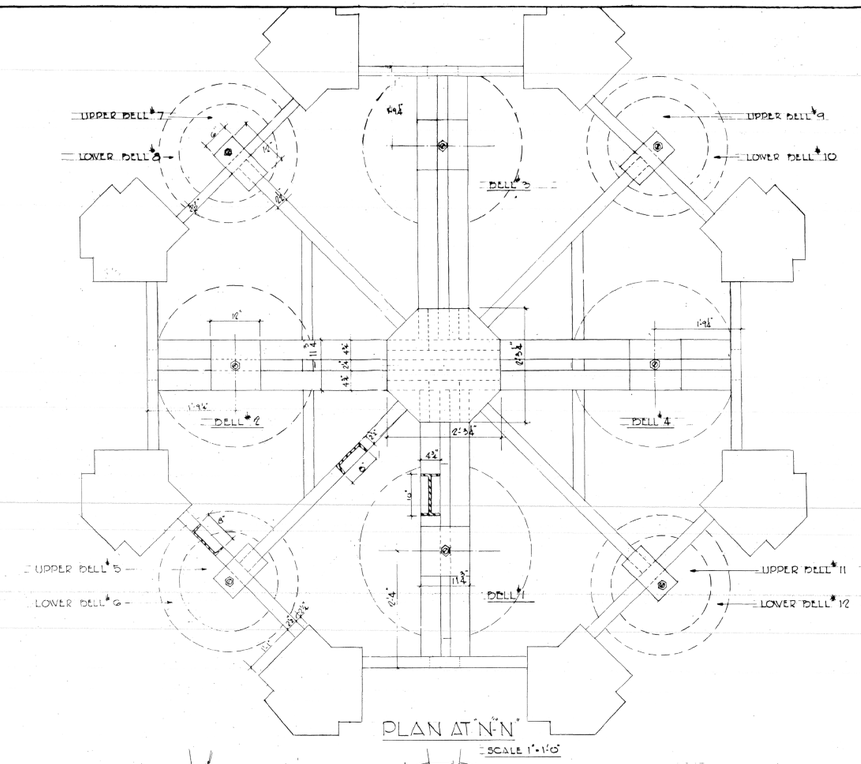


COURT ST. ELEV.

SCALE ¼" = 1'-0"

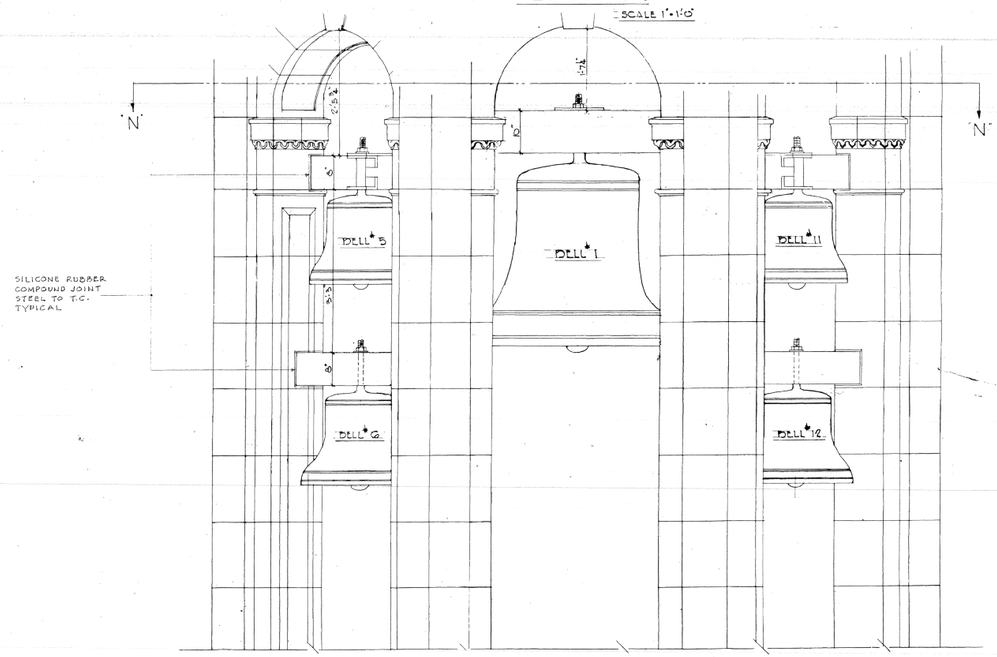
BELL IDENTIFICATION & INSCRIPTIONS

BELL #1 - "CITY HALL, SPRINGFIELD"
BELL #2 - "CHILDREN OF THE PUBLIC SCHOOLS"
BELL #3 - "CITIZENS OF SPRINGFIELD"
BELL #4 - "SPRINGFIELD, BOARD OF TRADE"
BELL #5 - "WILBUR FENDLON YOUNG"
BELL #6 - "F. LIVINGSTON PELL AND HARVEY WILLY CORBETT, ARCHITECTS"
BELL #7 - "NEWELL AND SONS"
BELL #8 - "CITIZENS OF SPRINGFIELD"
BELL #9 - "E.W. BESSER FAMILY"
BELL #10 - "MRS. WALTER H. WESSON"
BELL #11 - "GEORGE M. WENDELL"
BELL #12 - "MIRIAM KELLOGG PRATT AND GEORGE DWIGHT PRATT"



PLAN AT "N-N"

SCALE 1" = 1'-0"



FRONT (COURT ST.) ELEV.

SCALE 1" = 1'-0"

SIDE & COURT ST. ELEV'S.
DETS OF SUPPORTS FOR BELLS

RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.

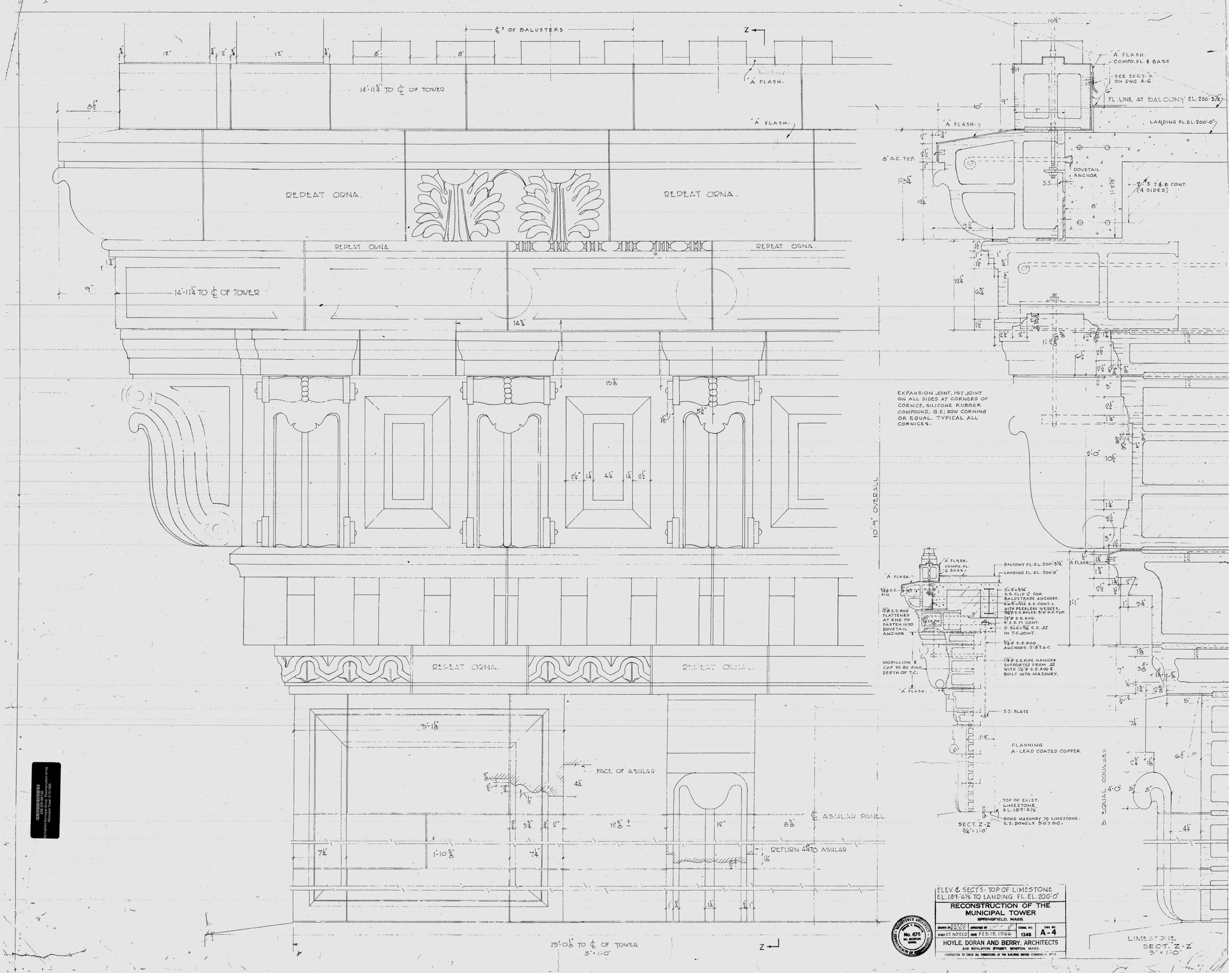
DRAWN BY	APPROVED BY	CONTR. NO.	DWG. NO.
SCALE AS NOTED	DATE FEB. 15, 1966	1248	A-3

HOYLE, DORAN AND BERRY, ARCHITECTS
248 BOYLSTON STREET, BOSTON MASS.

CONTRACTOR TO CHECK ALL DIMENSIONS AT THE BUILDING BEFORE COMMENCING WORK

REGISTERED ARCHITECT No. 675 BOSTON, MASS. COMMONWEALTH OF MASSACHUSETTS

256-CR-99129
Springfield Municipal Group Reconstruction of the Municipal Tower 2/15/1966



Springfield Municipal Group Preservation of the Municipal Tower 2013-2016

SECTION AT 'A'
SCALE 1" = 1'-0"

PLAN AT BALUSTER RAIL
SCALE 3/4" = 1'-0"

ELEVATION
SCALE 3/4" = 1'-0"

PLAN AT BALUSTER COPING
SCALE 3/4" = 1'-0"

SECT. AT 'F'
3/4" = 1'-0"

DETAIL #1
SCALE 3" = 1'-0"

PLAN AT 'C'
3/4" = 1'-0"

PLAN AT 'D'
3/4" = 1'-0"

SECTION AT 'F'
3" = 1'-0"

DETAIL #2

THIS PLAN SHOWS EXTERIOR DETAILS ONLY. SEE DWG A-2 FOR INTERIOR & BALCONY PLAN LAYOUT.

LANDING EL. 220'-3"

BALCONY FL. EL. 220'-6 1/8"

BALCONY FL. EL. 200'-3 1/2"

LANDING FL. EL. 200'-0"

ELEVATOR SHAFT

EXPANSION JOINT, 1ST JOINT ON ALL SIDES AT CORNERS OF BALUSTRADE & CORNICE. SILICONE RUBBER COMPOUND. G.E., DOW CORNING OR EQUAL. TYPICAL ALL CORNICES.

FLASHING
4# LEAD COATED COPPER

Springfield Municipal Group Documentation of the Municipal Tower 2/13/2002

PLANS, ELEV'S, SECT'S & DETAILS
LANDING FLOORS EL. 200'-0" & 220'-3"

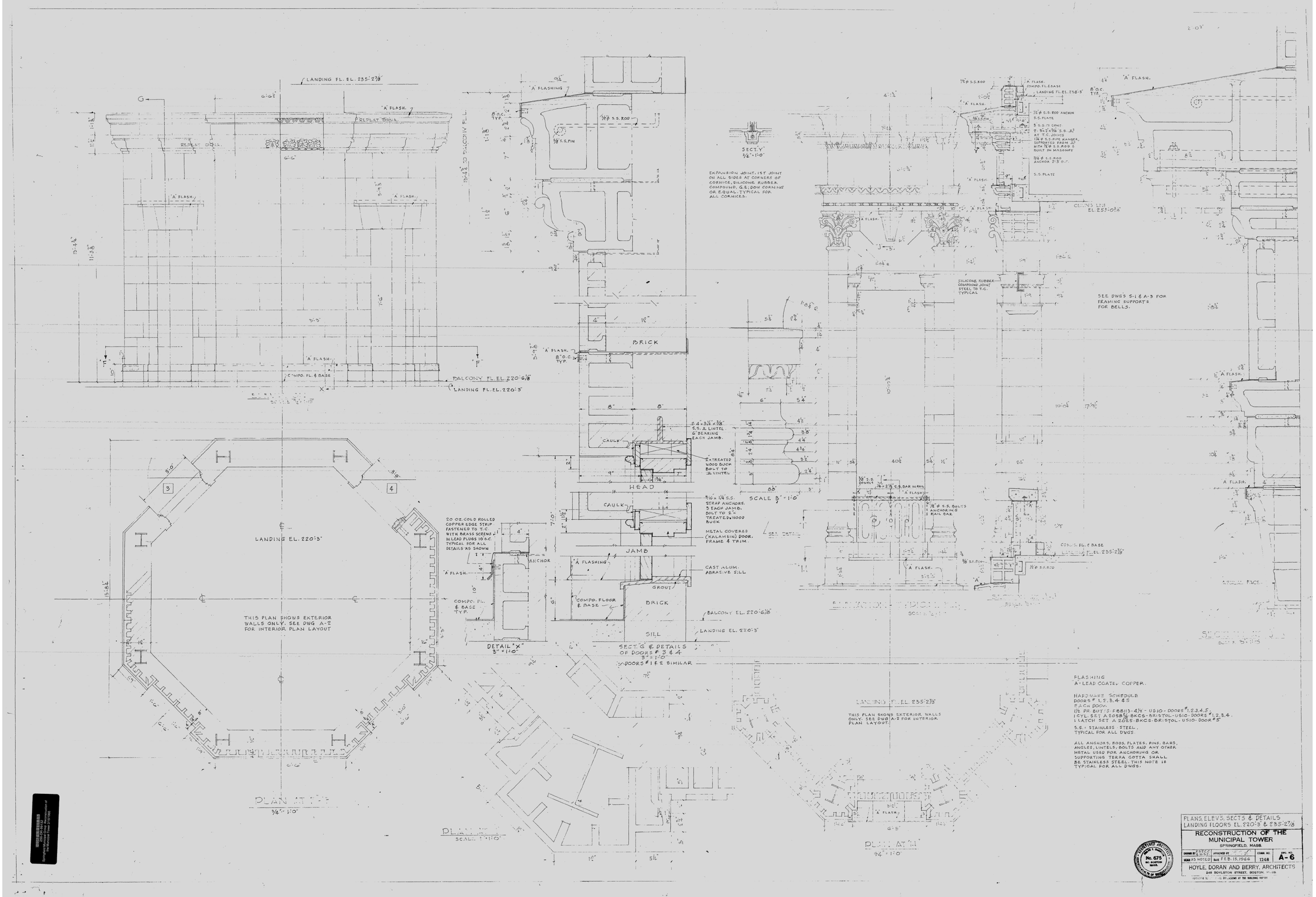
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.

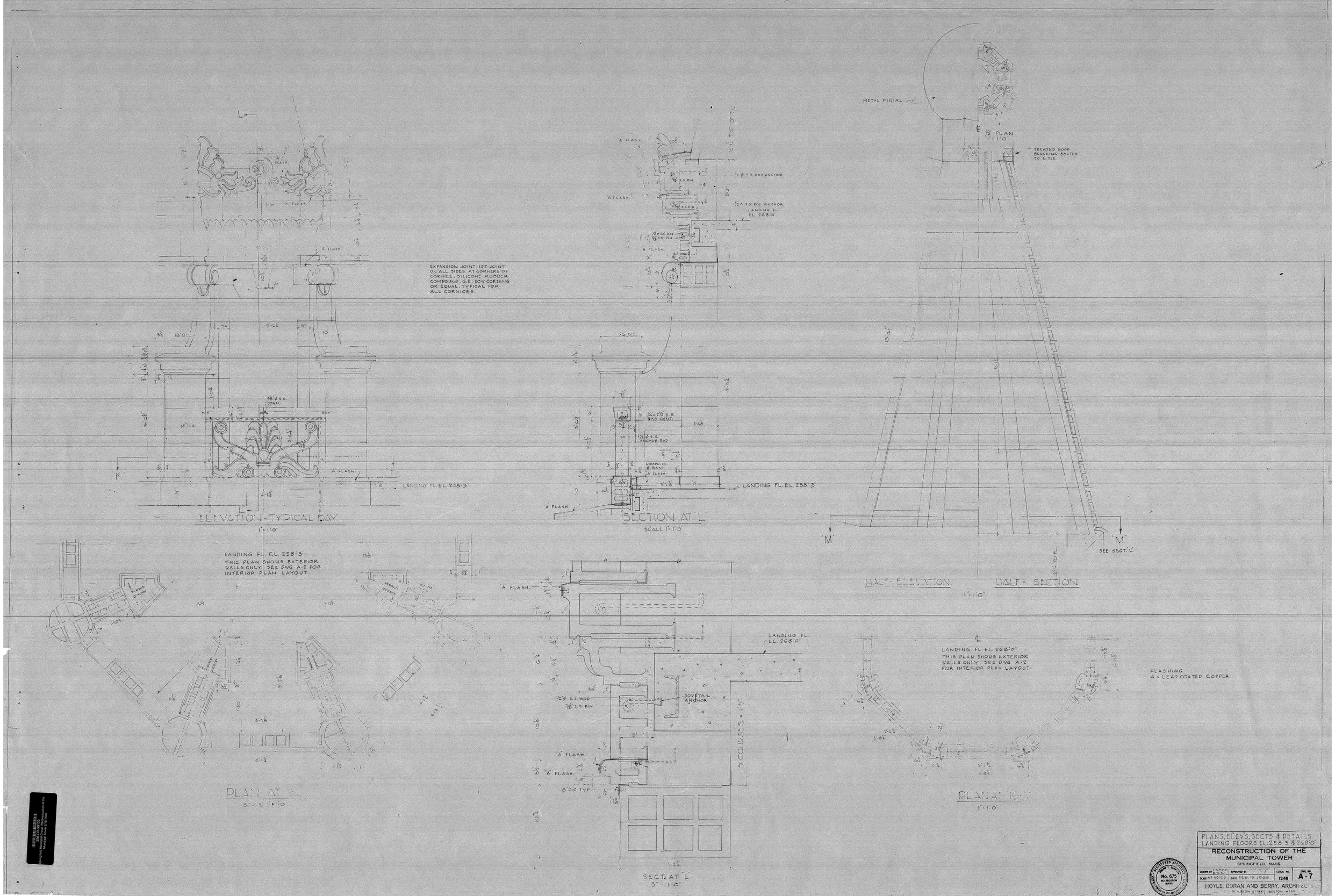
DRAWN BY E.S.C.K. / E.S.P.	APPROVED BY	CONTR. NO.	DWG. NO.
SCALE AS NOTED	DATE FEB. 15, 1966	1248	A-5

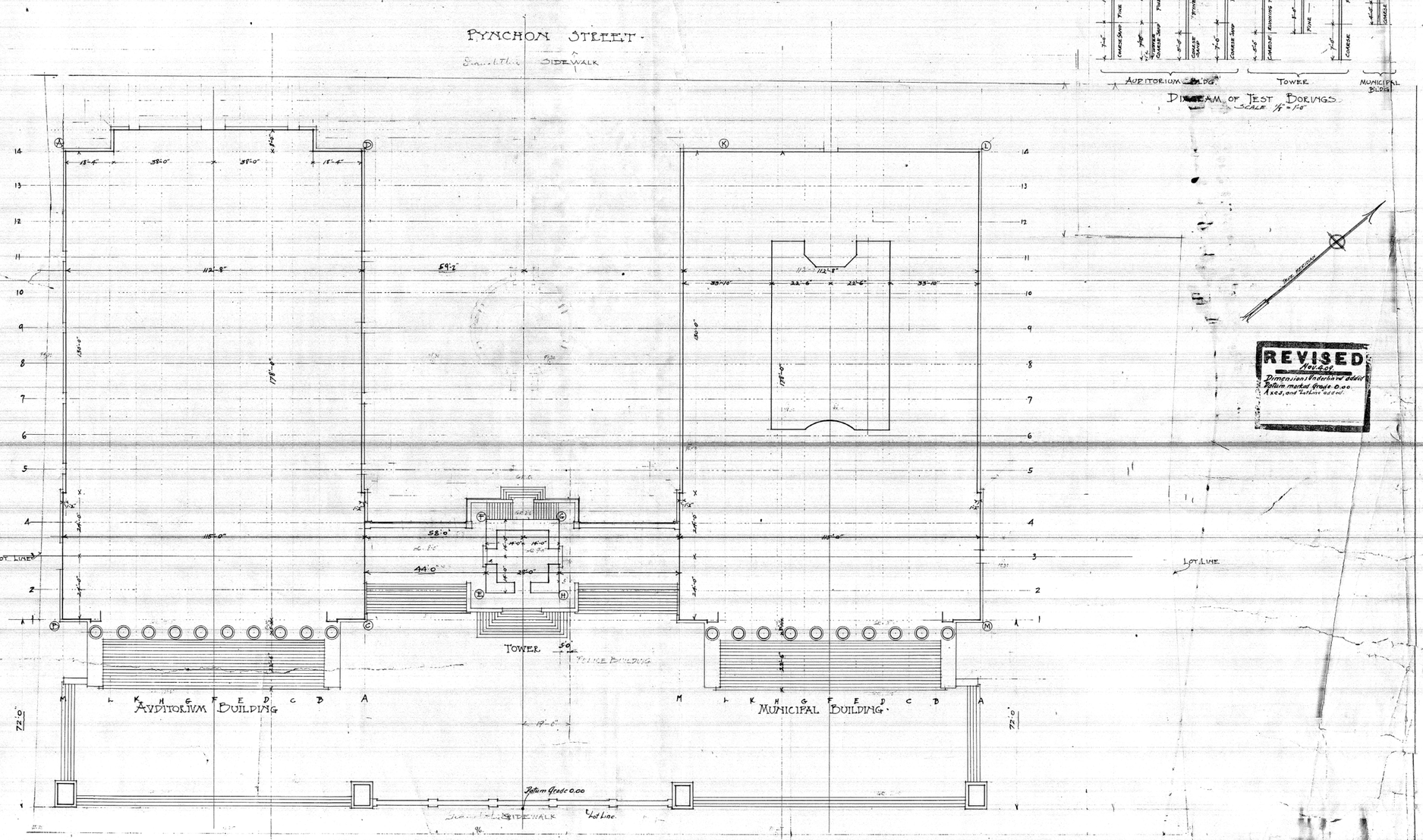
HOYLE, DORAN AND BERRY, ARCHITECTS
248 BOYLSTON STREET, BOSTON, MASS.

REGISTERED ARCHITECT No. 675 BO. BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS

CONTRACTOR TO CHECK ALL DIMENSIONS AT THE BUILDING BEFORE COMMENCING WORK


LANDING FL. EL. 235'-2 7/8"
"A" FLASH.
REPLAT DWG.
COMPO. FL. & BASE
BALCONY FL. EL. 220'-6 7/8"
LANDING FL. EL. 220'-3"
"A" FLASHING
1/2" ø S.S. ROD
5/8" S.S. PIN
TO BALCONY FL. EL.
8" O.C. TYP.
BRICK
2"x3 1/2"x3/8" S.S. ∠ LINTEL 6" BEARING EACH JAMB.
2" x TREATED WOOD BUCK BOLT TO ∠ LINTEL
CAULK
HEAD
3/16" x 1 1/4" S.S. STRAP ANCHORS. 3 EACH JAMB. BOLT TO 2" TREATED WOOD BUCK
METAL COVERED (KALAMEIN) DOOR, FRAME & TRIM.
JAMB
CAST ALUM. ABRASIVE SILL
GROUT
SILL
COMPO. FL. & BASE TYP.
BALCONY EL. 220'-6 7/8"
LANDING EL. 220'-3"
SECT. G & DETAILS OF DOORS # 3 & 4
3" = 1'-0"
DOORS # 1 & 2 SIMILAR
SCALE 3" = 1'-0"
SECT. "Y"
3/4" = 1'-0"
EXPANSION JOINT, 1ST JOINT ON ALL SIDES AT CORNERS OF CORNICE, SILICONE RUBBER COMPOUND, G.E.; DOW CORNING OR EQUAL. TYPICAL FOR ALL CORNICES.
1/2" ø S.S. ROD ANCHOR S.S. PLATE
5 S.S. TI CONT.
2 3/4"x3/8" S.S. ∠ AT T.C. JOINTS
1 3/4" S.S. PIPE HANGER, SUPPORTS FROM ∠ WITH 3/4" S.S. ROD & BUILT IN MASONRY
3/4" ø S.S. ROD ANCHOR 2'-3" O.C.
S.S. PLATE
CEILING LINE EL. 253'-0 3/8"
SILICONE RUBBER COMPOUND JOINT STEEL TO T.C. TYPICAL
SEE DWG'S S-1 & A-3 FOR FRAMING SUPPORTS FOR BELLS.
3/8" S.S. DOWEL
1/4"x2 1/2" S.S. BAR IN RAIL
1/4" ø S.S. BOLTS ANCHORING RAIL BAR
COMPO. FL. & BASE
LANDING FL. EL. 235'-2 7/8"
1/2" ø S.S. R.O.
ACTUAL FACE
20 OZ. COLD ROLLED COPPER EDGE STRIP FASTENED TO T.C. WITH BRASS SCREWS IN LEAD PLUGS 10" O.C. TYPICAL FOR ALL DETAILS AS SHOWN
ANCHOR
DETAIL "X"
3" = 1'-0"
LANDING EL. 220'-3"
THIS PLAN SHOWS EXTERIOR WALLS ONLY. SEE DWG A-2 FOR INTERIOR PLAN LAYOUT
PLAN AT 1st
3/4" = 1'-0"
PLAN AT 2nd
SCALE 1" = 1'-0"
LANDING FL. EL. 235'-2 7/8"
THIS PLAN SHOWS EXTERIOR WALLS ONLY. SEE DWG A-2 FOR INTERIOR PLAN LAYOUT.
PLAN AT 3rd
3/4" = 1'-0"
SECOND FLOOR
SCALE 1" = 1'-0"
FLASHING
4# LEAD COATED COPPER.
HARDWARE SCHEDULE
DOORS # 1, 2, 3, 4 & 5
EACH DOOR:
1 1/2 PR BUTTS: FBB113-4 1/2 - US10 - DOORS # 1, 2, 3, 4, 5.
1 CYL. SET A2058 5/8 - BKCS - BRISTOL - US10 - DOORS # 1, 2, 3, 4.
1 LATCH SET A2055 - BKCS - BRISTOL - US10 - DOOR # 5
S.S. = STAINLESS STEEL.
TYPICAL FOR ALL DWGS.
ALL ANCHORS, RODS, PLATES, PINS, BARS, ANGLES, LINTELS, BOLTS AND ANY OTHER METAL USED FOR ANCHORING OR SUPPORTING TERRA COTTA SHALL BE STAINLESS STEEL. THIS NOTE IS TYPICAL FOR ALL DWGS.
PLANS, ELEVS, SECTS & DETAILS
LANDING FLOORS EL. 220'-3" & 235'-2 7/8"
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.
DRAWN BY
APPROVED BY
COMM. NO. 1248
DWG. NO. A-6
SCALE AS NOTED
DATE FEB. 15, 1966
No. 675 BD. BOSTON MASS.
HOYLE, DORAN AND BERRY, ARCHITECTS
648 BOYLSTON STREET, BOSTON, MASS.
REGISTERED ARCHITECT COMMONWEALTH OF MASSACHUSETTS


ELEVATION - TYPICAL BAY
1" = 1'-0"
A FLASH
LANDING FL. EL. 258'-3"
EXPANSION JOINT, 1ST JOINT ON ALL SIDES AT CORNERS OF CORNICE. SILICONE RUBBER COMPOUND, G.E.; DOW CORNING OR EQUAL. TYPICAL FOR ALL CORNICES.
SECTION AT L
SCALE 1" = 1'-0"
COMPO. FL. & BASE
LANDING FL. EL. 258'-3"
METAL FINIAL
1/2 PLAN
1" = 1'-0"
TREATED WOOD BLOCKING BOLTED TO L TIE
HALF ELEVATION
HALF SECTION
1" = 1'-0"
SEE SECT. L
LANDING FL. EL. 258'-3"
THIS PLAN SHOWS EXTERIOR WALLS ONLY. SEE DWG A-2 FOR INTERIOR PLAN LAYOUT.
PLAN AT K
SCALE 1" = 1'-0"
LANDING FL. EL. 268'-0"
DOVETAIL ANCHOR
5 COURSES = 1'-5"
SECT. AT L
3" = 1'-0"
LANDING FL. EL. 268'-0"
THIS PLAN SHOWS EXTERIOR WALLS ONLY. SEE DWG A-2 FOR INTERIOR PLAN LAYOUT.
FLASHING
A = LEAD COATED COPPER
PLAN AT M
1" = 1'-0"
PLANS, ELEVS, SECTS & DETAILS
LANDING FLOORS EL. 258'-3" & 268'-0"
RECONSTRUCTION OF THE
MUNICIPAL TOWER
SPRINGFIELD, MASS.
DRAWN BY
APPROVED BY
CONTR. NO.
1248
DWG. NO.
A-7
SCALE AS NOTED
DATE FEB. 15, 1966
No. 675
HOYLE, DORAN AND BERRY, ARCHITECTS
BOSTON, MASS.



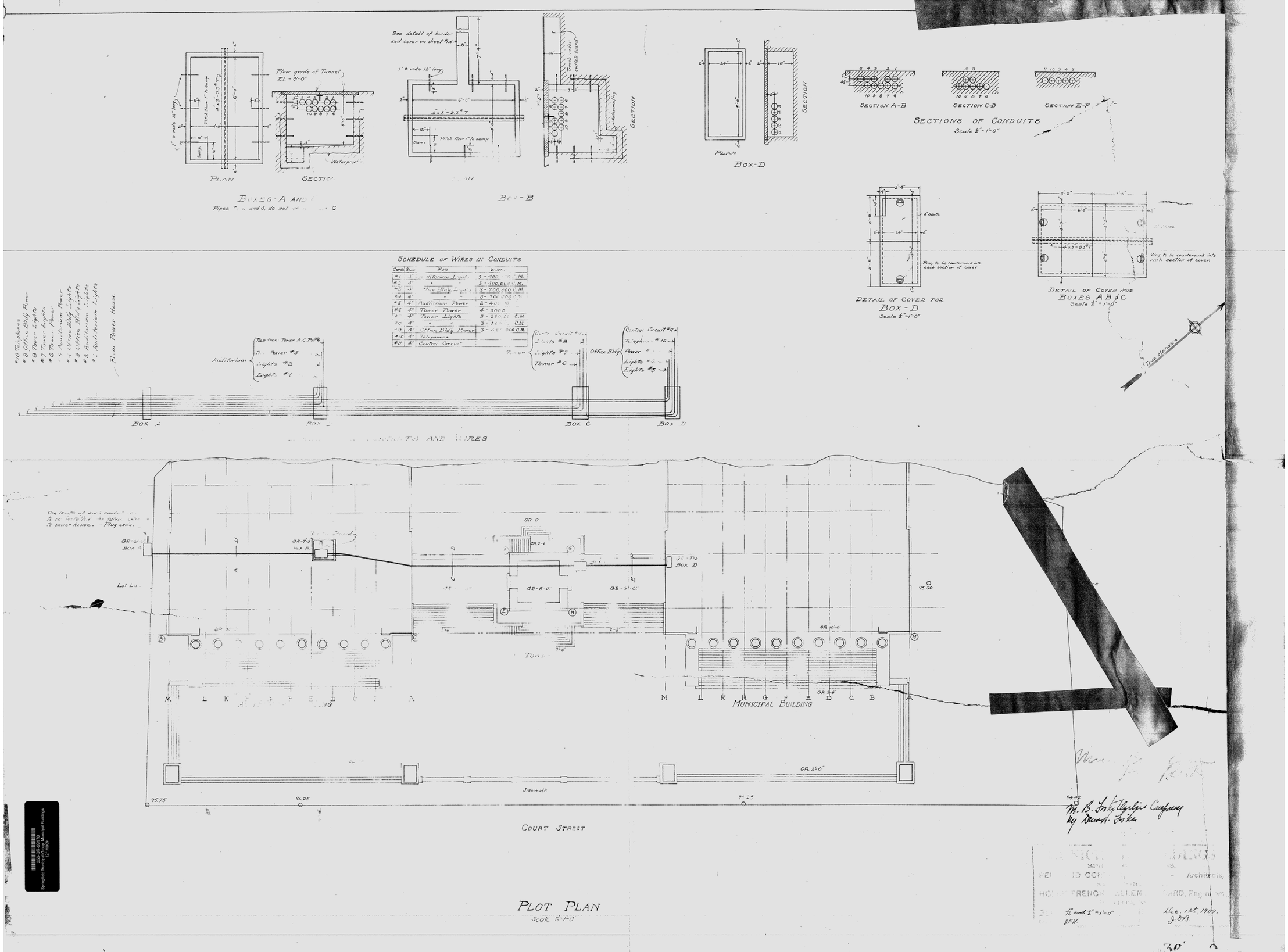
SPRINGFIELD MUNICIPAL BUILDINGS
PLOT PLAN

MUNICIPAL BUILDINGS
SPRINGFIELD, MASS.
JOB NUMBER 182
PELL AND CORBETT, ARCHTS.
122 EAST 25th STREET, NEW YORK CITY.
SCALE 1/16"=1'-0"
DRAWN BY L.P.B.
CHECKED BY
DATE Oct. 1915

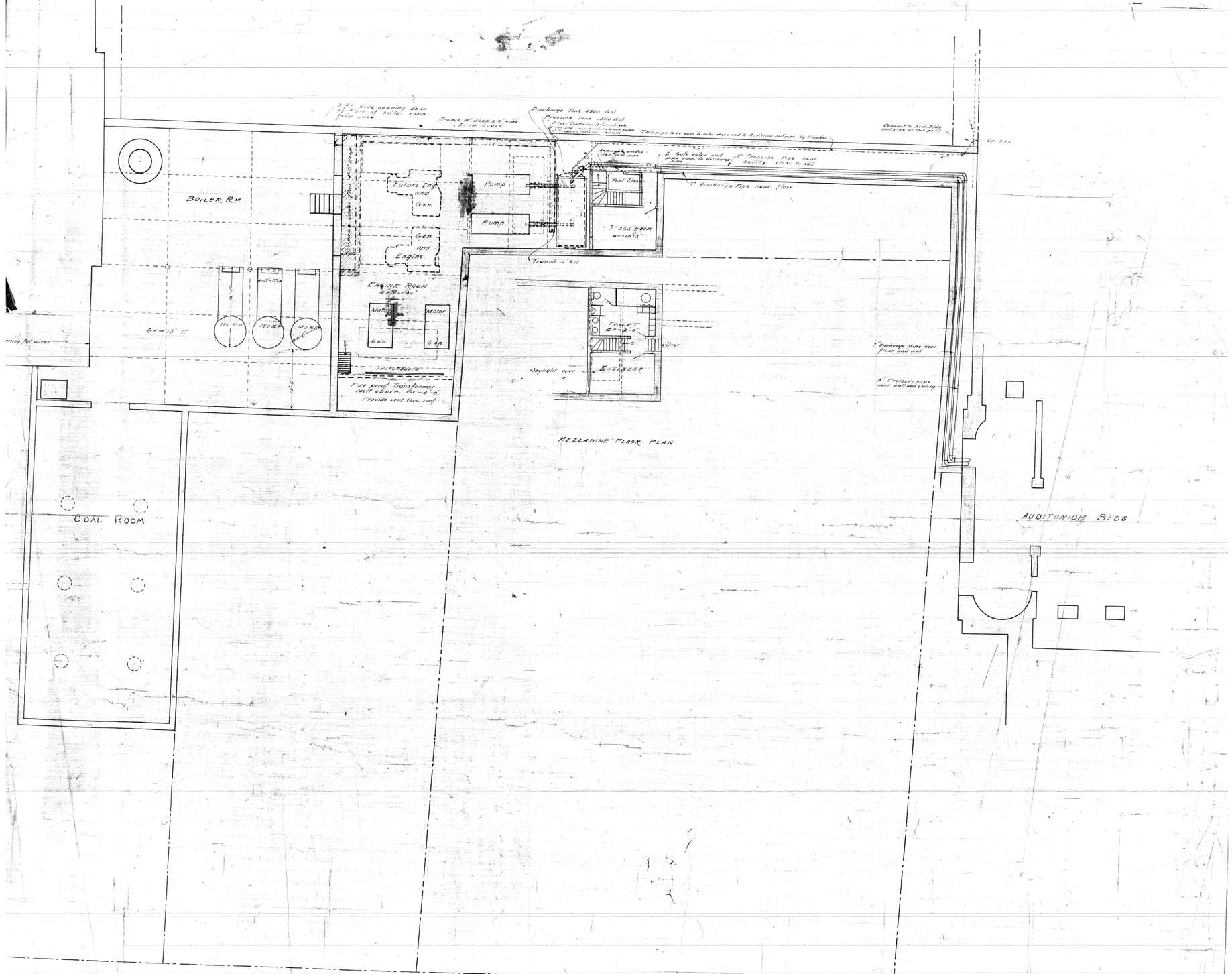
W.D. 1

GR. 0.00 = CITY DATUM 46.00

BERTHA BERKOWITZ
256-28-9587
Springfield Municipal Buildings
1/27/09

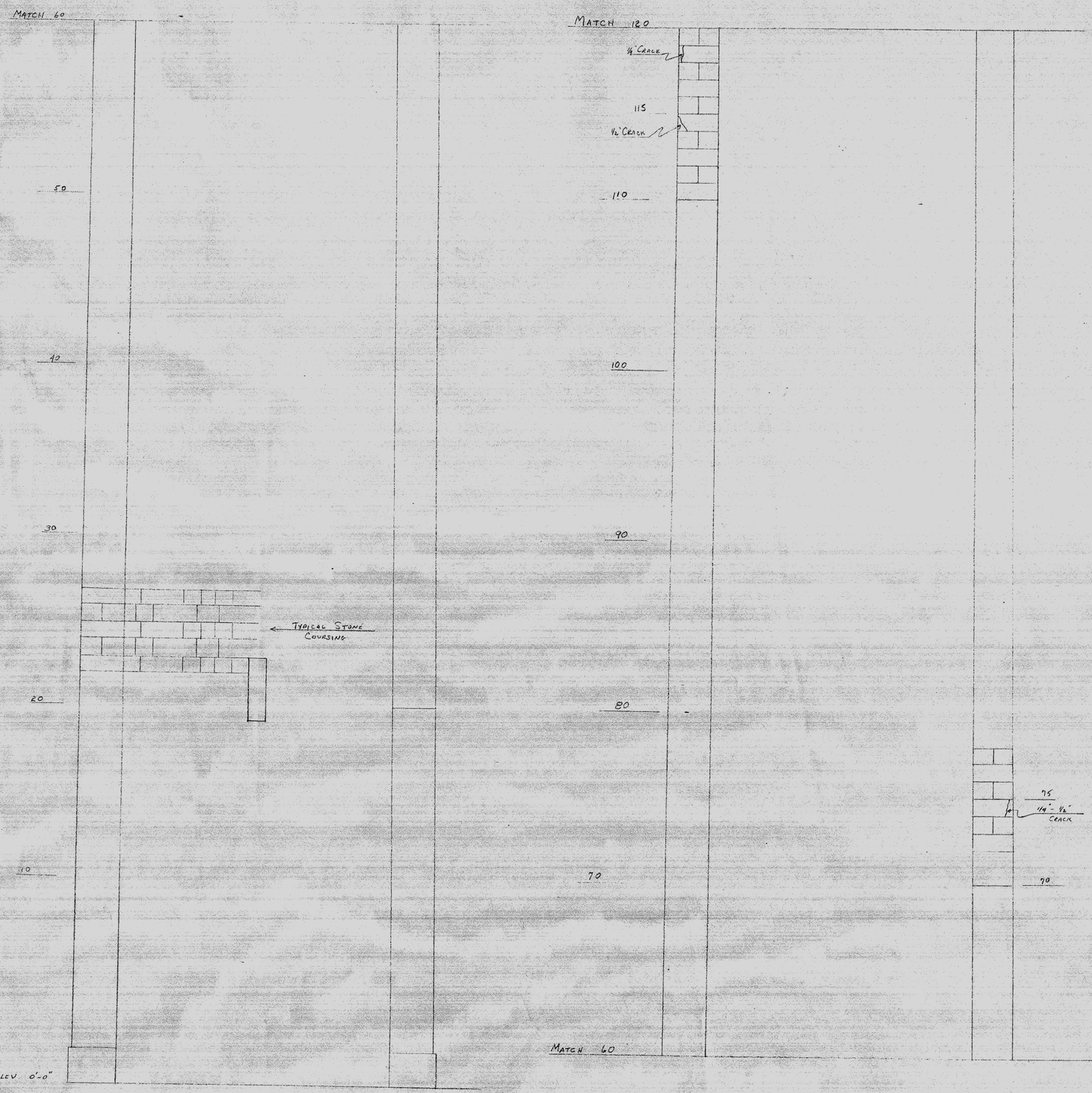


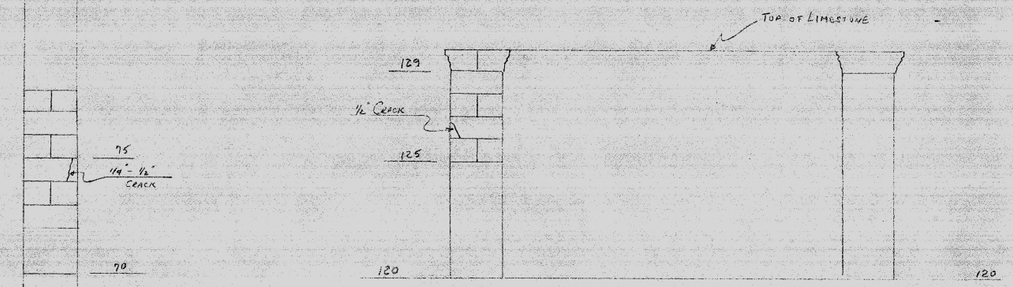
Springfield Photo
Springfield Photo Archives
Springfield, Illinois
217-525-3123



266-DR-98154
Springfield Municipal Group Municipal Buildings
12/1/1909

U ICIPAL BUILDINGS
SPRINGFIELD, MASS.
KIRK & PARLETT, Architects,
NEW YORK, N. Y.
HOLLIS ENCH & ALLEN HUBBARD, Engineers
BOSTON, MASS.
Scale, 1/8" = 1'-0" Date, AUG 30, 1910
Drawn By Checked By





Note:- Majority of cracks appear to be full depth of stone

MUNICIPAL TOWER, SPRINGFIELD		
CRACKS IN LIMESTONE		
AUDITORIUM ELEVATION (WEST)		
ARCHITECTS: HOYLE DORAN & BERRY		
CONTRACTOR: A. BELANGER & SONS		
DATE 3/6/67	DRAWN BY P.T.Q	SCALE 1/8" = 1'-0"

CITY HALL ELEVATION

Note:- Majority of cracks appear to be full depth of stone

MUNICIPAL TOWER, SPRINGFIELD

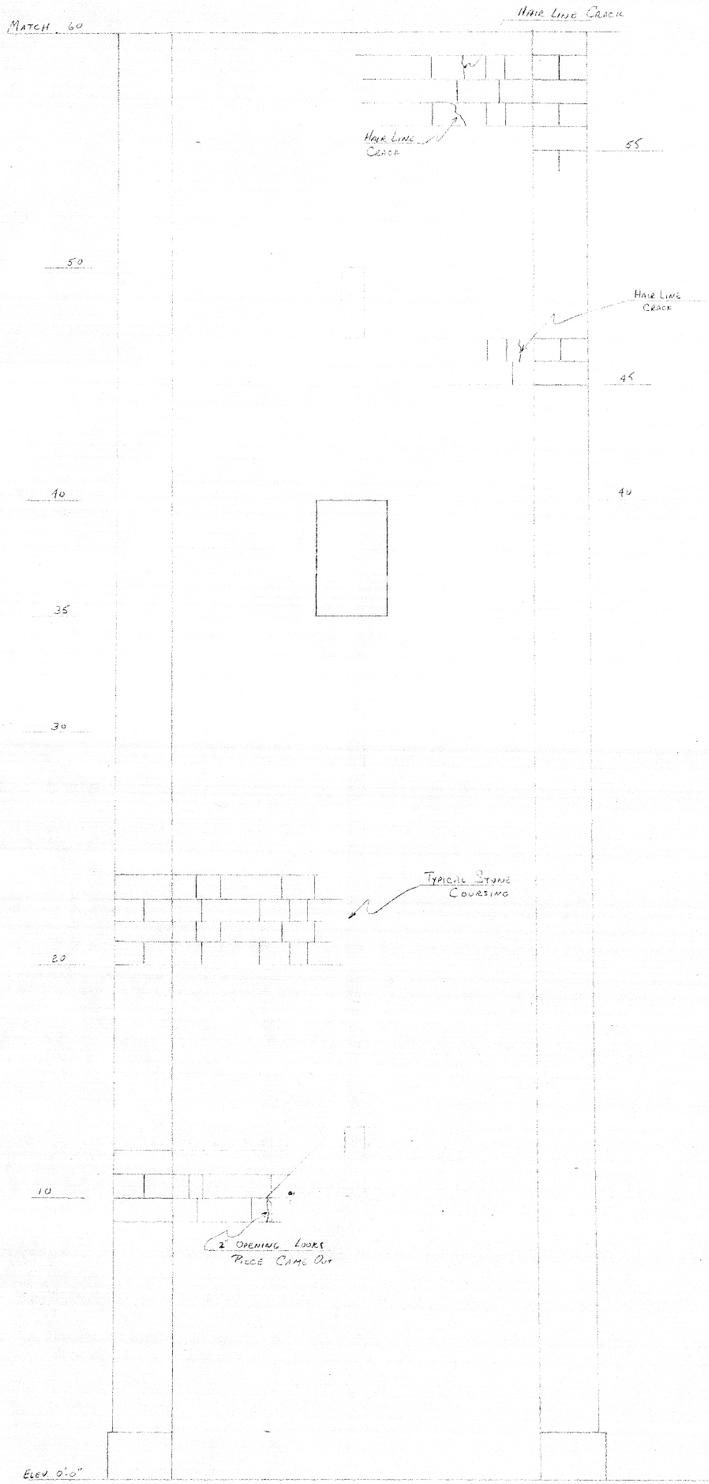
CRACKS IN LIMESTONE

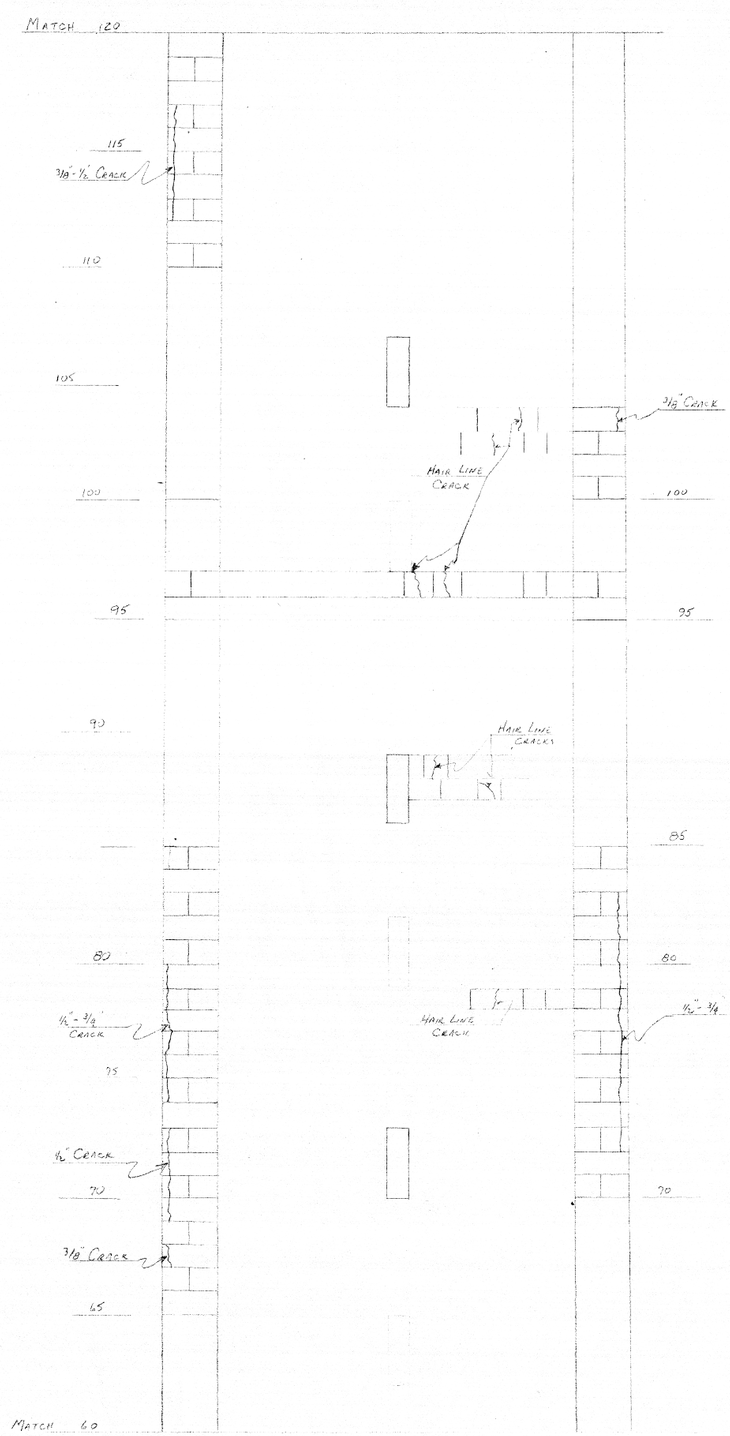
CITY HALL ELEVATION (EAST)

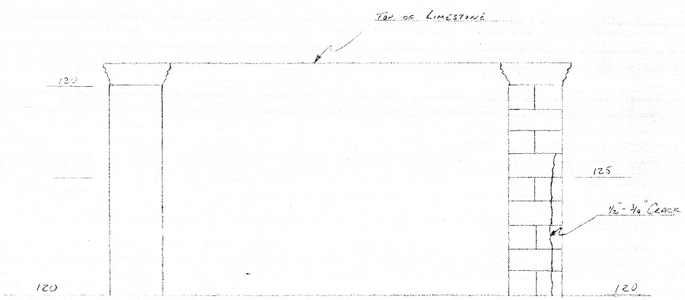
ARCHITECTS: HOYLE DORAN & BERRY

CONTRACTOR: A. BELANGER & SONS

DATE 3/2/67 | DRAWN B. P.T.B. | SCALE: 1/4" = 1'-0"

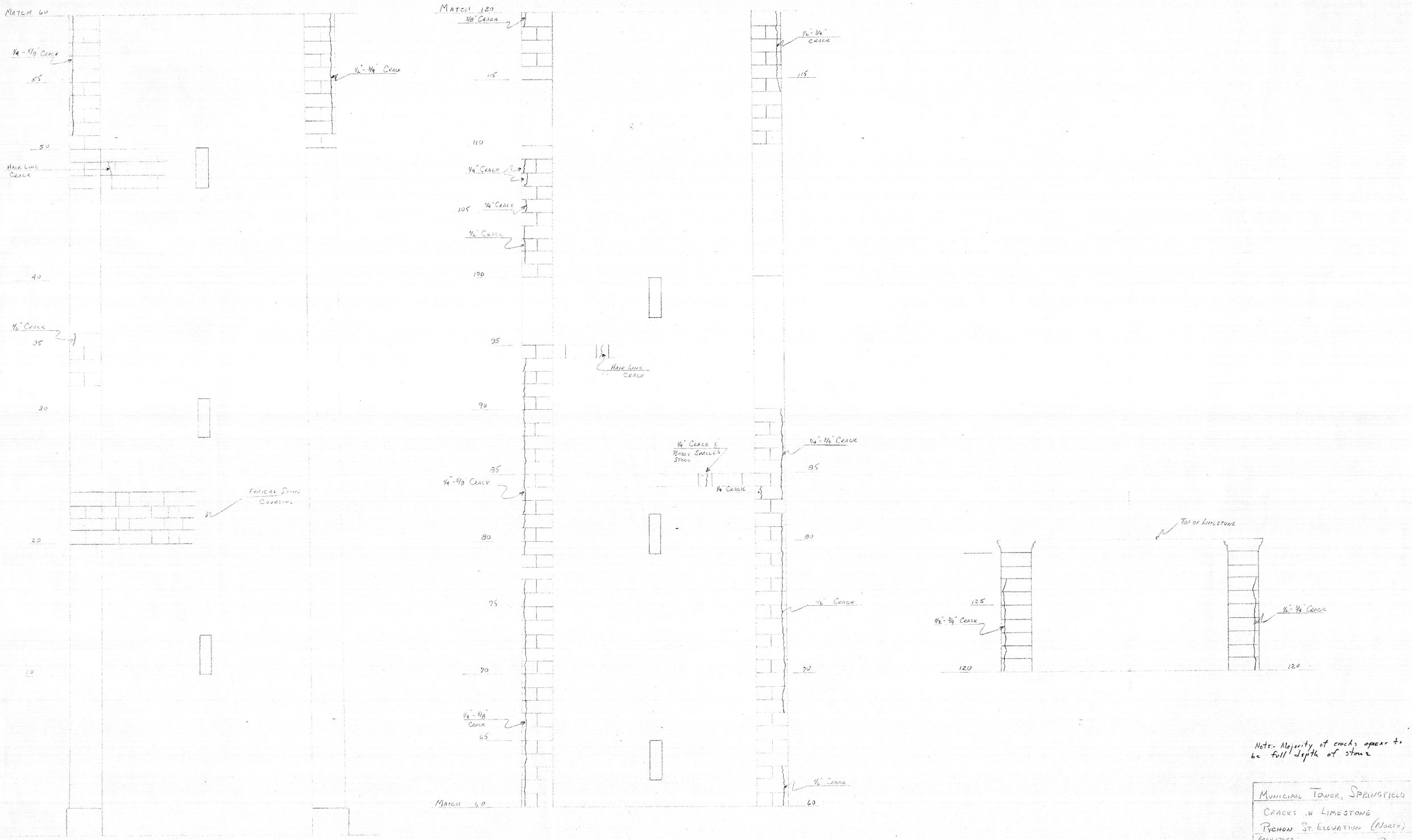






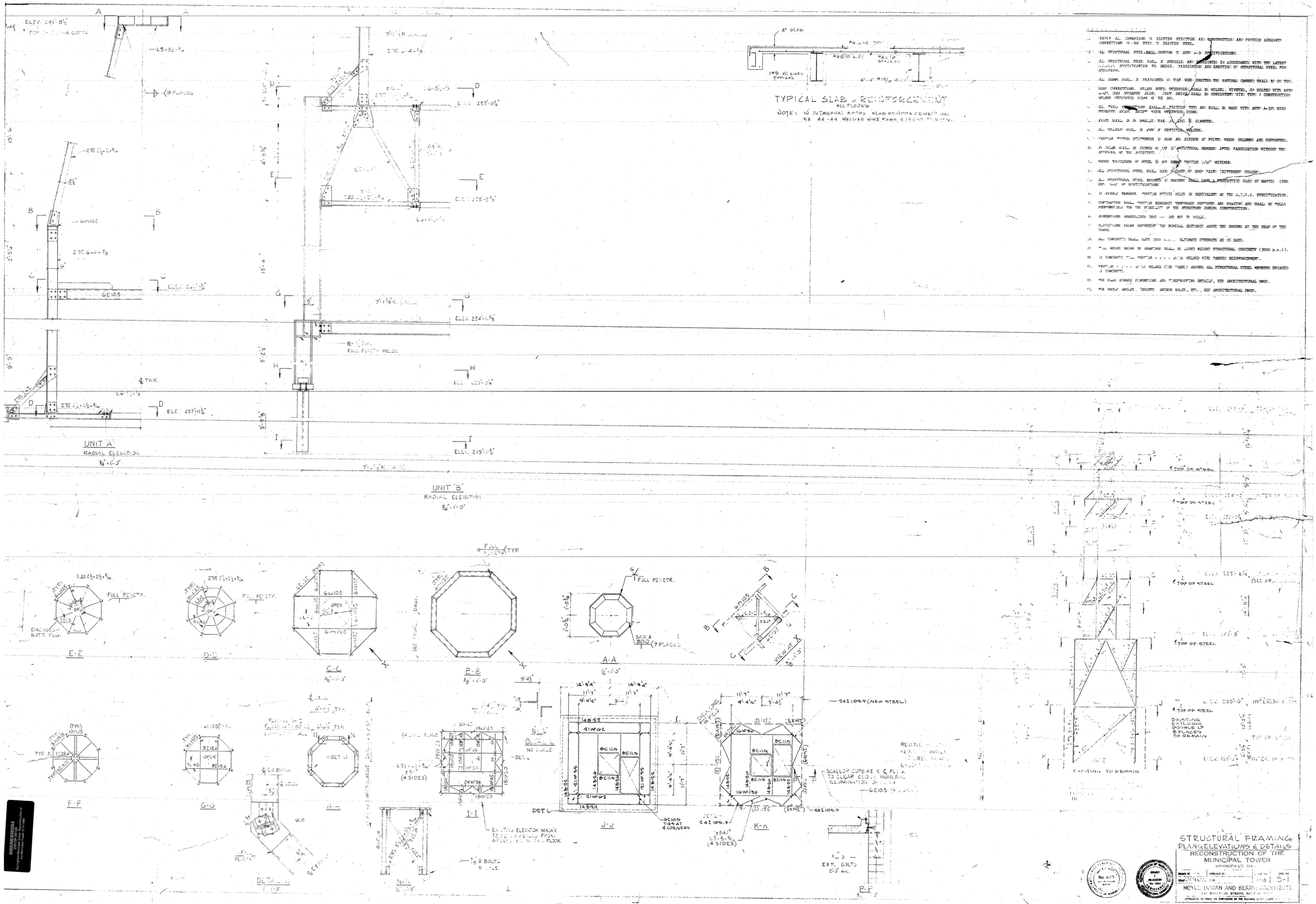
Note:- Majority of cracks appear to be full depth of stone

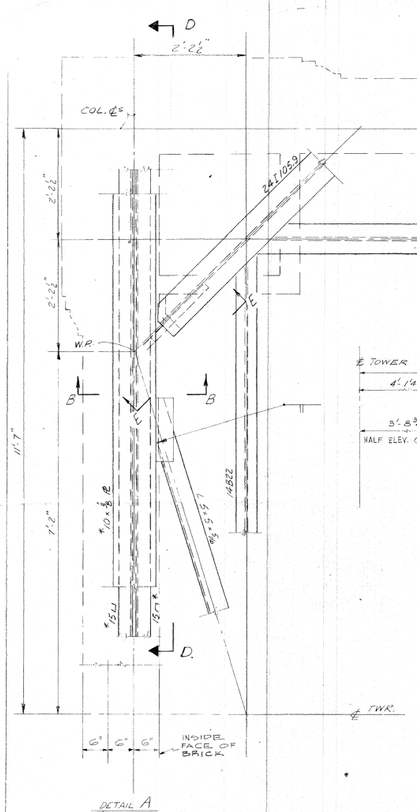
MUNICIPAL TOWER, SPRINGFIELD		
CRACKS IN LIMESTONE		
COURT ST. ELEVATION (SOUTH)		
ARCHITECT: HOYLE DORAN & BERRY		
CONTRACTOR: A. BECHINGER & SONS		
DATE 3/6/67	DRAWN BY PTQ	SCALE 1/4" = 1'-0"



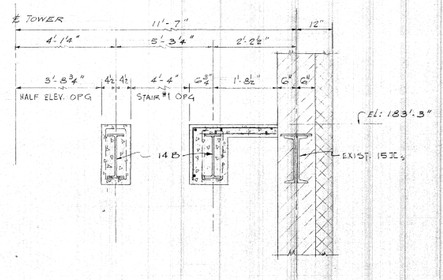
Note:- Majority of cracks appear to be full depth of stone

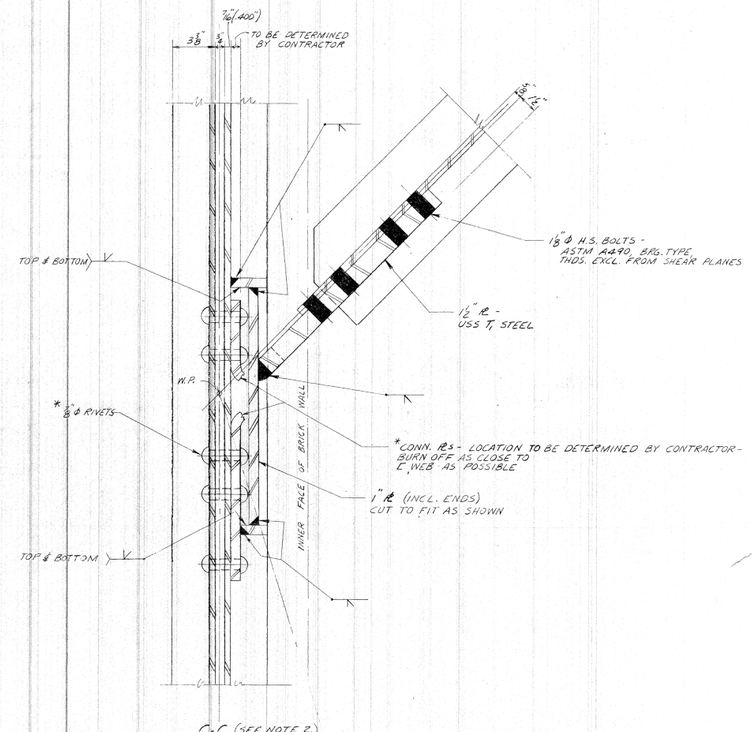
MUNICIPAL TOWER, SPRINGFIELD		
CRACKS IN LIMESTONE		
PYCHON ST. ELEVATION (NORTH)		
ARCHITECT: HOYLE DORAN & BERRY		
CONTRACTOR: A. BELONGIE & SONS		
DATE 2/3/67	DRAWN BY PTQ	SCALE 1/4" = 1'-0"


UNIT "A"
RADIAL ELEVATION
UNIT "B"
RADIAL ELEVATION
TYPICAL SLAB & REINFORCEMENT
ALL FLOORS
NOTE: IN OCTAGONAL ROOMS SLAB REINFORCEMENT WAS 6X6 4.4-4.4 WELDED WIRE FABRIC
A-A
B-B
C-C
D-D
E-E
F-F
G-G
H-H
I-I
J-J
K-K
STRUCTURAL FRAMING
PLANS, ELEVATIONS & DETAILS
RECONSTRUCTION OF THE
MUNICIPAL TOWER
WINCHESTER, MASS.
HOYLE, TUCKAN AND BERRY, ARCHITECTS

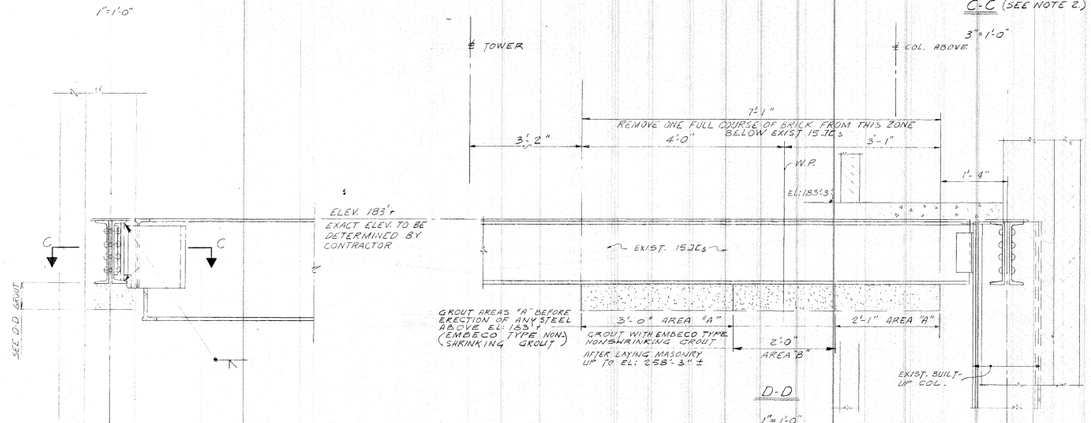


DETAIL A
1"=1'-0"

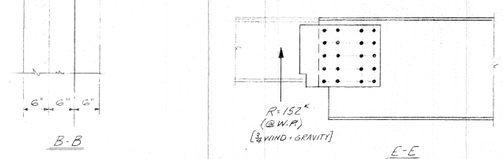




C-C (SEE NOTE 2)
3"=1'-0"

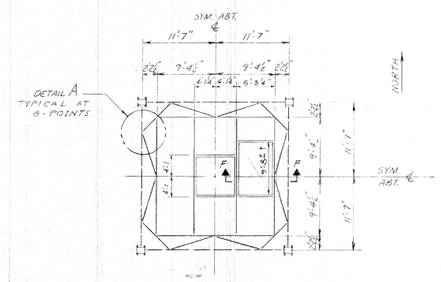


D-D
1"=1'-0"



B-B
1"=1'-0"

E-E
1"=1'-0"



PLAN AT ELEV. 183'+
⅛"=1'-0"

NOTES

1. ASTERISK (*) IDENTIFIES ASSUMED EXISTING STEEL.
2. CONTRACTOR IS TO SUBMIT SHOP DRAWINGS CONSISTENT WITH INDICATED DESIGN LOAD AND FIELD CONDITIONS TO ARCHITECT FOR REVIEW.

1. ± VARIFY THIS DIMENSION AT STRUCTURE. OPENING MUST BE LARGE ENOUGH FOR EXISTING STEEL STAIR.
2. ENCASE ALL NEW STRUCTURAL STEEL IN CONCRETE.

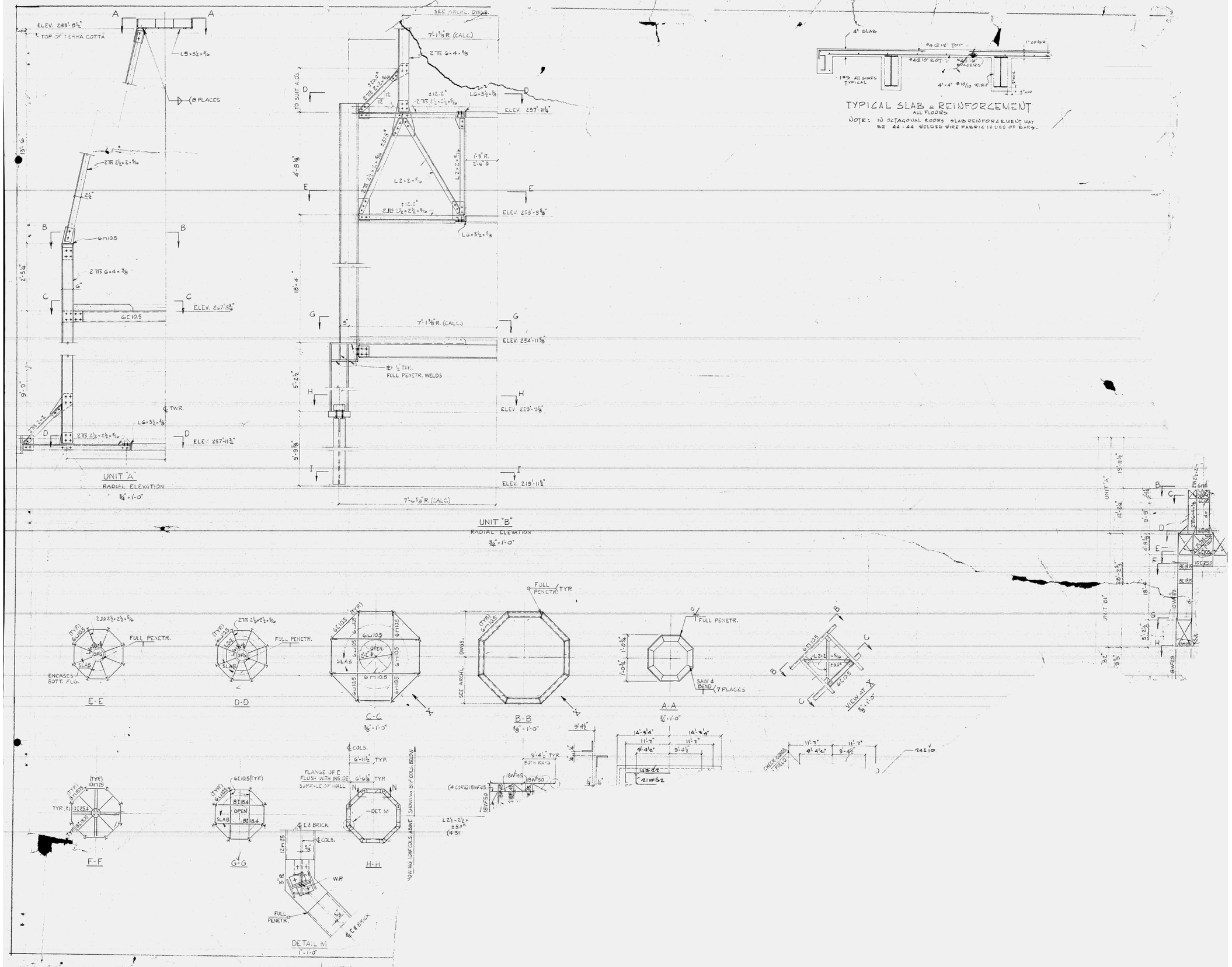
CORNER DIAGONAL CONN. DETAILS AT ELEV. 183'+

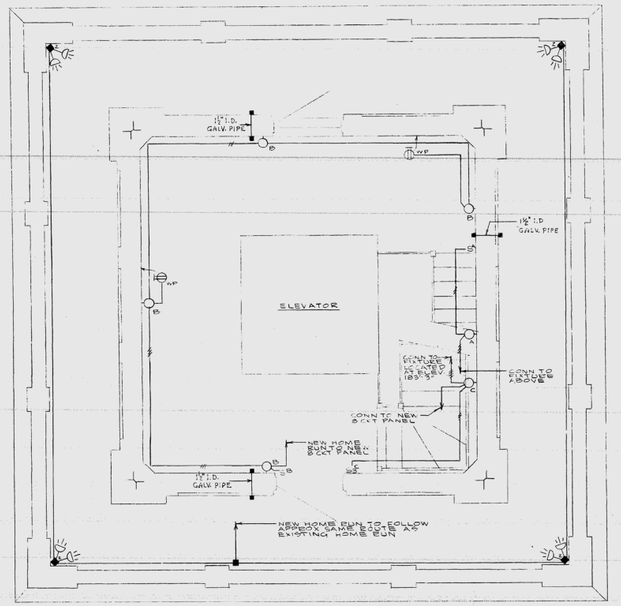
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, OHIO

DRAWN BY DR | DATE 4/18/66 | SCALE AS NOTED | DWG. NO. S-2

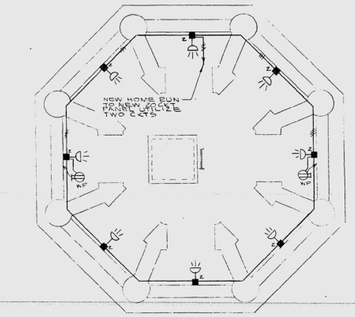
ROYLE, LOGAN, AND BERRY ARCHITECTS
DAYTON, OHIO

CORRESPOND TO DATE OF SUBMITTING DRAWING FOR CONSTRUCTION

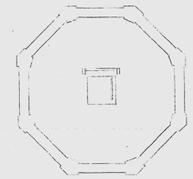

ELEV. 288'-8½"
TOP OF TERRA COTTA
L5×3½×5/16
(8 PLACES)
2 ⊓ 6×4×3/8
6 ⊓ 10.5
ELEV. 267'-8½"
ELEV. 257'-11⅜"
UNIT "A"
RADIAL ELEVATION
3/16" = 1'-0"
SEE ARCH. DWGS.
7'-1⅜" R. (CALC.)
ELEV. 257'-11⅜"
ELEV. 253'-3⅜"
ELEV. 234'-11⅜"
ELEV. 229'-9⅜"
ELEV. 219'-11⅜"
7'-6⅜" R. (CALC.)
UNIT "B"
RADIAL ELEVATION
3/16" = 1'-0"
4" SLAB
TYPICAL SLAB & REINFORCEMENT
ALL FLOORS
NOTE: IN OCTAGONAL RODS SLAB REINFORCEMENT MAY BE 44-44 WELDED WIRE FABRIC IN LIEU OF BARS.
FULL PENETR.
ENCASES BOTT. FLG.
E-E
D-D
C-C
3/8" = 1'-0"
B-B
3/8" = 1'-0"
A-A
3/8" = 1'-0"
SAW & BEND (7 PLACES)
VIEW AT X
3/8" = 1'-0"
F-F
G-G
H-H
DETAIL M
1" = 1'-0"
FLANGE OF E FLUSH WITH INSIDE SURFACE OF WALL
DET. M
E & BRICK
W.P.
FULL PENETR.
SHOWING S.F. COLS. BELOW
SHOWING LOWER COLS. ABOVE
21 W 62
18 WF 45
18 WF 50
24 I 10



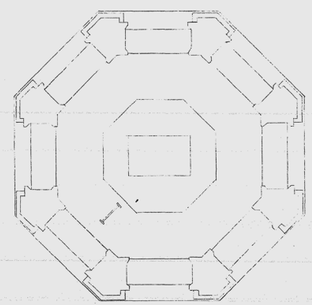
PLAN AT ELEV. 200'-3½"



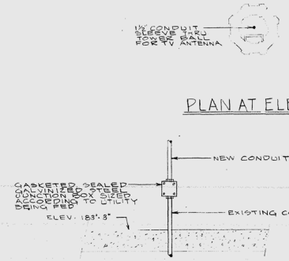
PLAN AT ELEV. 258'-3"



PLAN AT ELEV. 268'-0"



PLAN AT ELEV. 23F 2⅞"

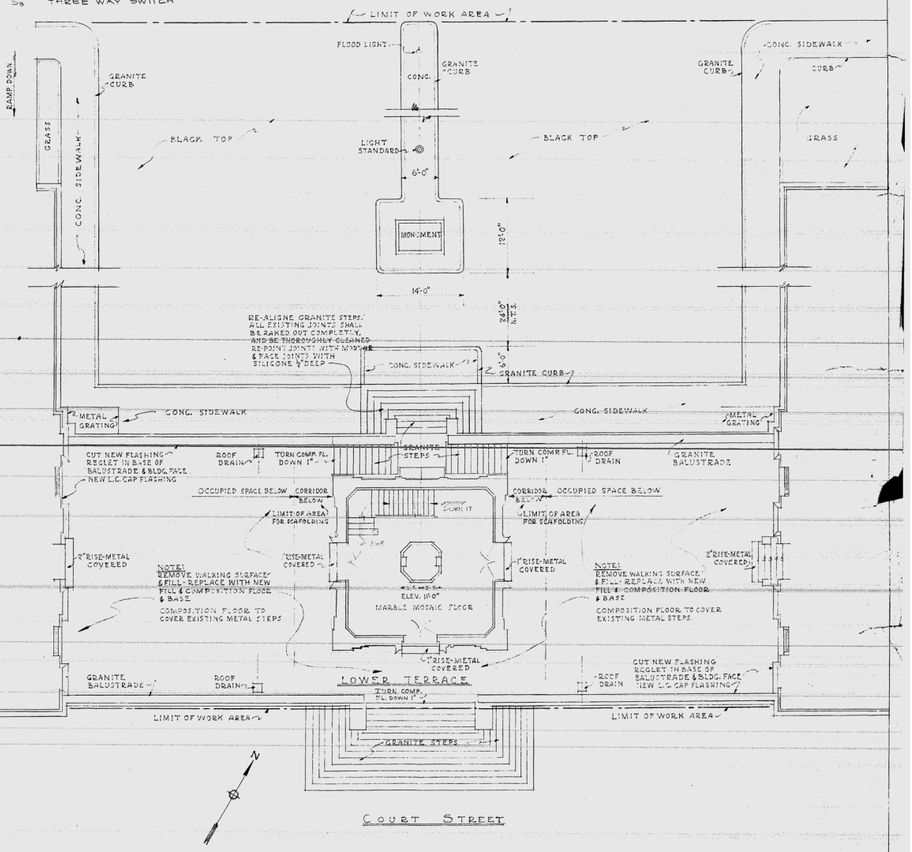


PLAN AT ELEV. 283'-8"

DETAIL SHOWING METHOD OF CUTTING BACK EXISTING CONDUITS

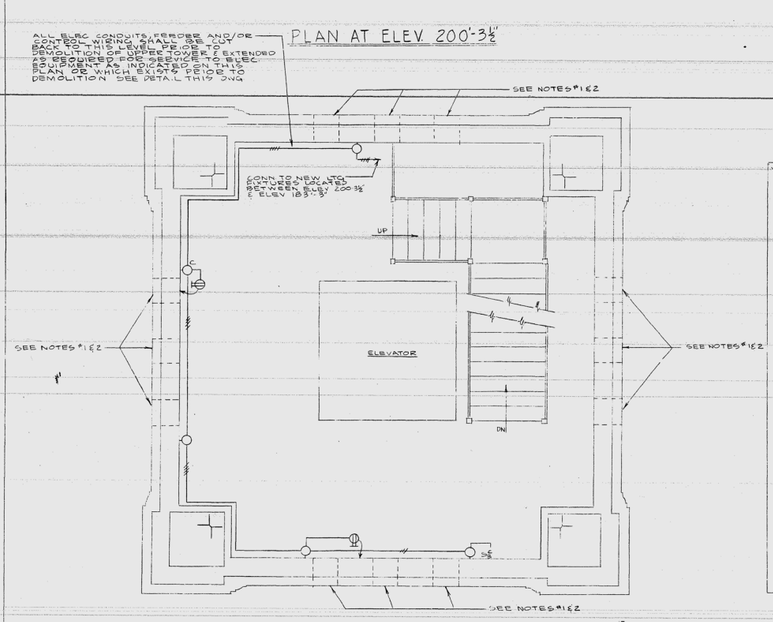
SYMBOL LIST

- WALL BRACKET FIXTURE W/ OUTLET McPHILBEN CAT# 43 44 WITH 60W "E" LAMP OR APPROVED EQUAL MTD 2'-0" ABOVE FINISHED FLOOR
- FLOOD LIGHT STONCO CAT# 150-L W/ 150W PAR 38 FLOOD LAMP OR APPROVED EQUAL
- JUNCTION BOX STONCO CAT# 7-C OR APPROVED EQUAL
- SINGLE POLE SW. UPPER LETTER INDICATES SWITCH CONTROL
- CONDUIT RUN EXPOSED
- DUPLEX RECEPTACLE W.P. INDICATES WEATHERPROOF
- CONDUIT RISER
- TV JUNCTION BOX SIZE IN ACCORDANCE W/ ANTENNA REQUIREMENTS
- THREE WAY SWITCH

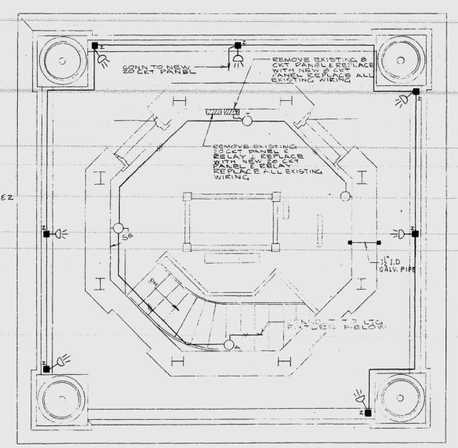


SITE PLAN OF TOWER

SCALE 1/8" = 1'-0"



PLAN AT ELEV. 183'-3"



PLAN AT ELEV. 220'-6⅛"

NOTE

ALL PLANS AT SCALE 1/8" = 1'-0"

NOTES

1. DISCONNECT & REMOVE THESE ILLUMINATED CLOCK NUMERALS PRIOR TO DEMOLITION AND REPLACE & RECONNECT SAME UPON COMPLETION OF CONSTRUCTION
2. DISCONNECT ALL ELECTRICAL ENERGY TO THE CLOCK TO PREVENT POSSIBLE INJURY DURING CONSTRUCTION

REGISTERED ARCHITECT No. 675 CITY OF BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS

SITE PLAN & ELECTIC PLANS

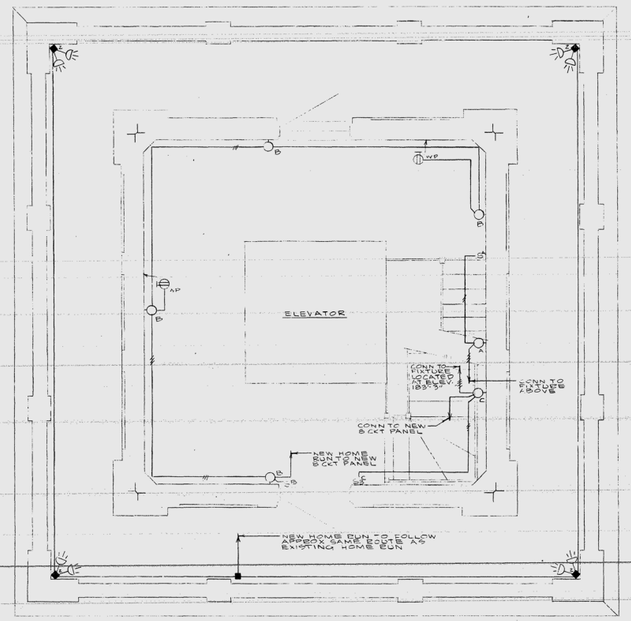
RECONSTRUCTION OF THE MUNICIPAL TOWER

SPRINGFIELD, MASS.

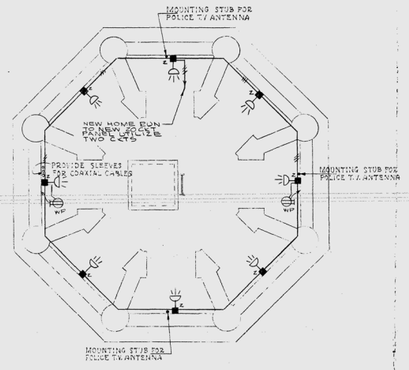
DRAWN BY E.A.T.	APPROVED BY	COMM. NO.	DWG. NO.
SCALE AS NOTED	DATE FEB. 15, 1966	1248	A-1

HOYLE, DORAN AND BERRY, ARCHITECTS

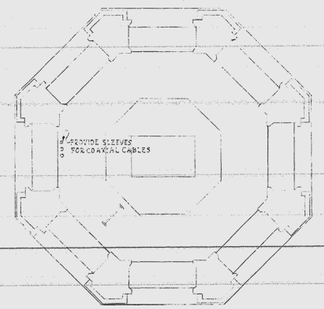
TWENTY ONE BEACON STREET, BOSTON, MASS.



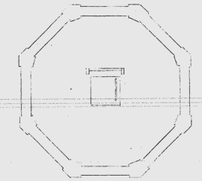
PLAN AT ELEV. 183'-3"



PLAN AT ELEV. 258'-3"



PLAN AT ELEV. 235'-2 7/8"

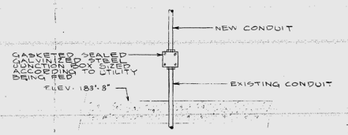


PLAN AT ELEV. 268'-0"

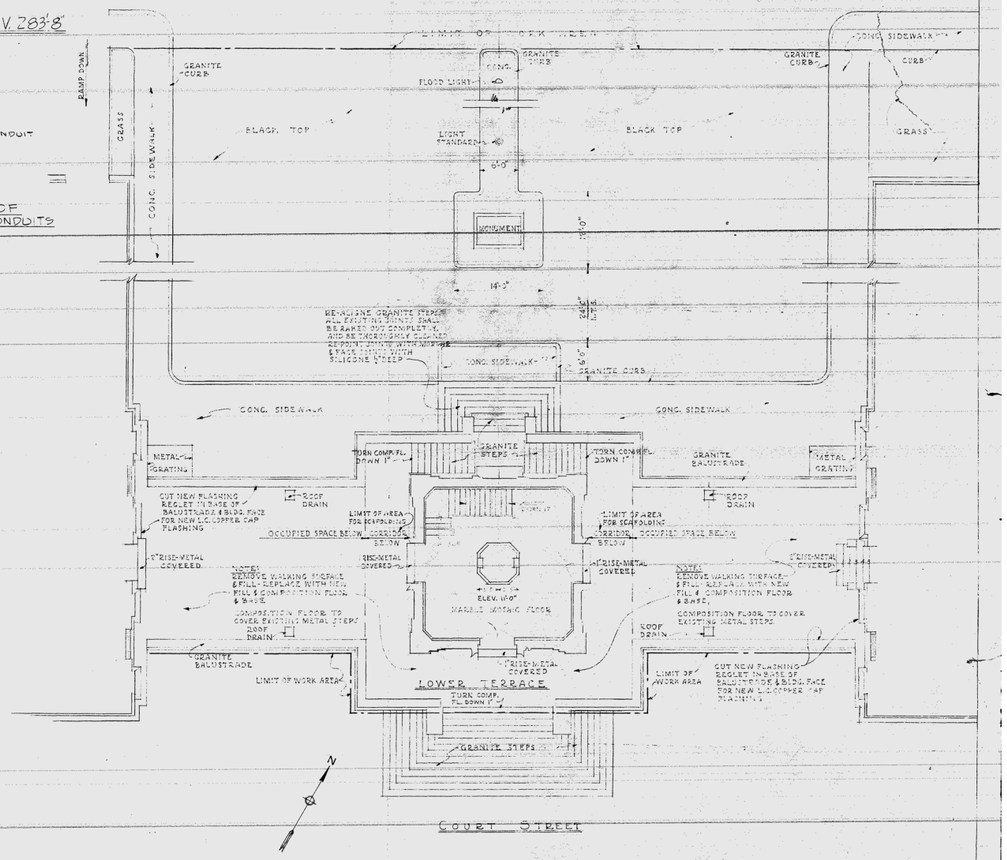
PLAN AT ELEV. 283'-8"

SYMBOL LIST

- WALL BRACKET FIXT.-SE W/OUTLET MCPHILBEN CAT# 43 44 W/ 100 W I.N. LAMP OR APPROVED EQUAL MTD C.O. ABOVE FINISHED FLOOR
- FLOOD LIGHT STONCO CAT# 150-L W/150W PAR 38 FLOOD LAMP OR APPROVED EQUAL
- JUNCTION BOX STONCO CAT# 7-C OR APPROVED EQUAL
- SINGLE POLE SW UPPER LETTER INDICATES SWITCH CONTROL
- 1/2" CONDUIT RUN EXPOSED
- DUPLEX RECEPTACLE WP INDICATES WEATHERPROOF
- CONDUIT RISER
- TV JUNCTION BOX SIZE IN ACCORDANCE W/ ANTENNA REQUIREMENTS
- THREE WAY SWITCH

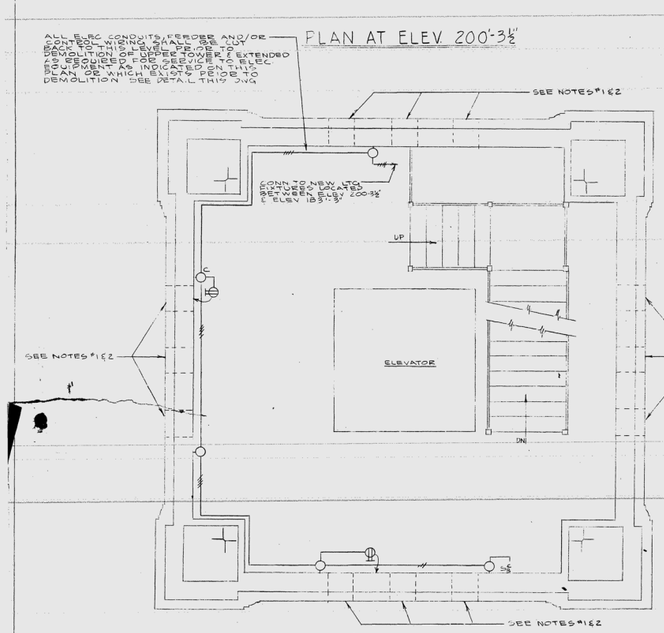


DETAIL SHOWING METHOD OF CUTTING BACK EXISTING CONDUITS

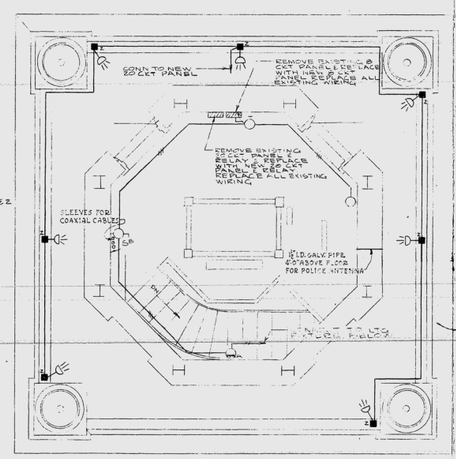


SITE PLAN OF TOWER

SCALE 1/8" = 1'-0"



PLAN AT ELEV. 183'-3"



PLAN AT ELEV. 220'-6 1/8"

NOTE
ALL PLANS AT SCALE 1/8" = 1'-0"

NOTES
1. DISCONNECT & REMOVE THESE ILLUMINATED CLOCK NUMERALS PRIOR TO DEMOLITION AND REPLACE & RECONNECT SAME UPON COMPLETION OF CONSTRUCTION
2. DISCONNECT ALL ELECTRICAL ENERGY TO THE CLOCK TO PREVENT POSSIBLE INJURY DURING CONSTRUCTION

REVISED FEB. 23, 1966 - FOR ADDENDA #1

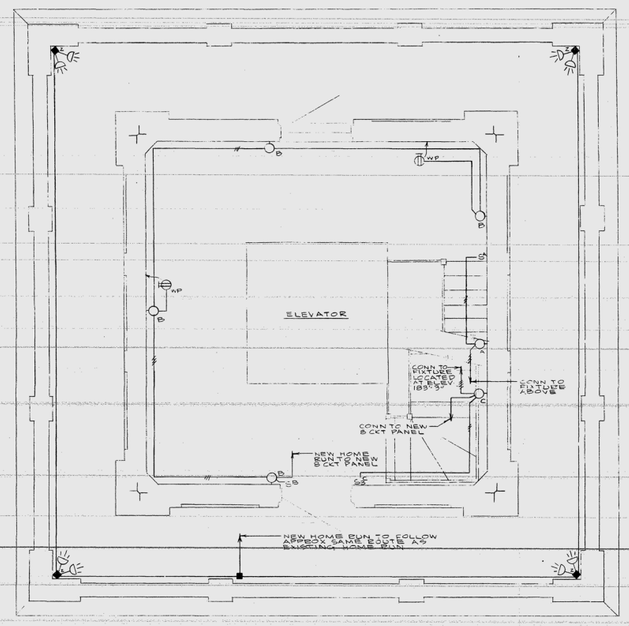
SITE PLAN & ELECTRIC PLANS

RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.

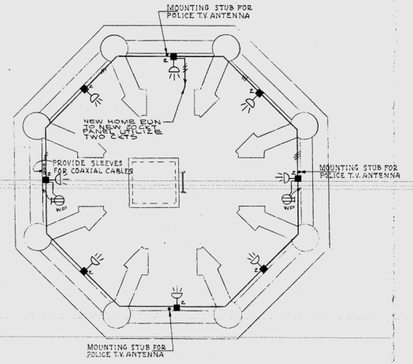
DRAWN BY	CHECKED BY	APPROVED BY	CONTR. NO.	DWG. NO.
E.A.C.			1248	A-1
SCALE AS NOTED	DATE FEB. 15, 1966			

HOYLE, DORAN AND BERRY, ARCHITECTS
HYNDSTON STREET, BOSTON, MASS.

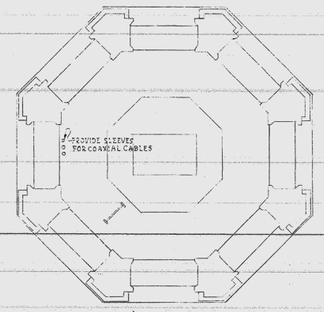
REGISTERED ARCHITECT No. 675 MASSACHUSETTS



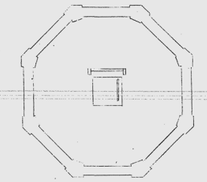
PLAN AT ELEV 183'-3"



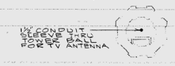
PLAN AT ELEV 258'-3"



PLAN AT ELEV 235'-2⅞"



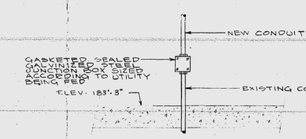
PLAN AT ELEV 268'-0"



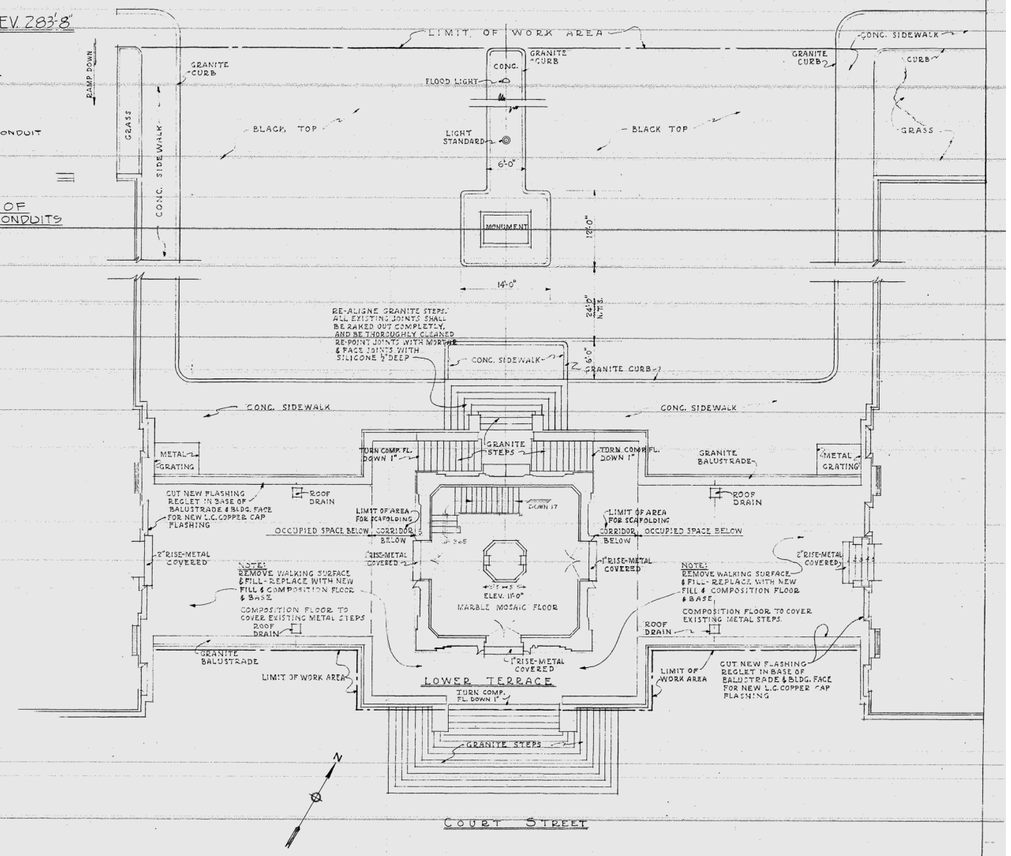
PLAN AT ELEV 283'-8"

SYMBOL LIST

- WALL BRACKET FIXTURE W/ OUTLET MCPHILDEN CAT # 43-44 WITH 100W I.E. LAMP OR APPROVED EQUAL MTD 6'-0" ABOVE FINISHED FLOOR
- FLOOD LIGHT STONCO CAT # 130-L W/ 150W PAR 38 FLOOD LAMP OR APPROVED EQUAL
- JUNCTION BOX STONCO CAT # 19-C OR APPROVED EQUAL
- SINGLE POLE SW UPPER LETTER INDICATES SWITCH CONTROL
- CONDUIT RUN EXPOSED
- DUPLEX RECEPTACLE W.P. INDICATES WEATHERPROOF
- CONDUIT RISER
- TV JUNCTION BOX SIZE IN ACCORDANCE W/ ANTENNA REQUIREMENTS
- THREE WAY SWITCH



DETAIL SHOWING METHOD OF CUTTING BACK EXISTING CONDUITS
-NTS-

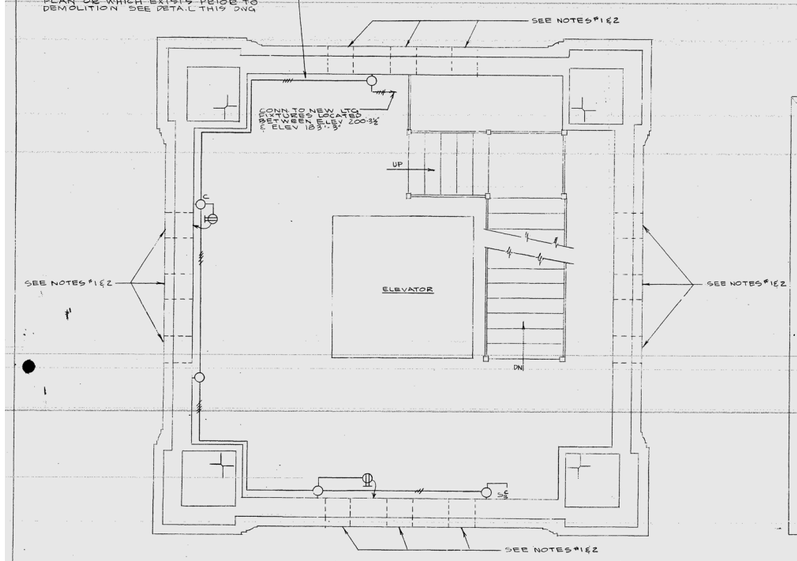


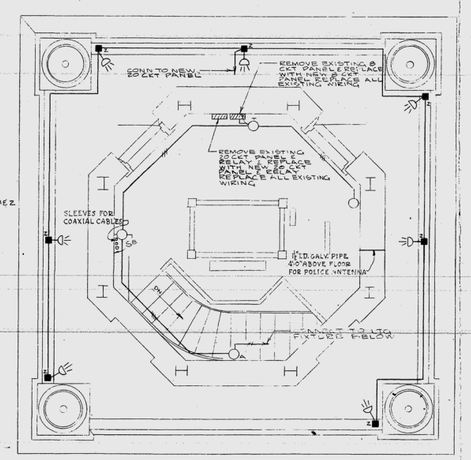
SITE PLAN OF TOWER

SCALE 1/8" = 1'-0"

ALL ELEC. CONDUITS, PIPEWAY AND/OR CONTROL WIRING SHALL BE CUT BACK TO THIS LEVEL PRIOR TO DEMOLITION OF UPPER TOWER & EXTENDED AS REQUIRED FOR SERVICE TO ELEC. EQUIPMENT AS INDICATED ON THIS PLAN OR WHICH EXISTS PRIOR TO DEMOLITION SEE DETAIL THIS DWG

PLAN AT ELEV 200'-3⅛"





PLAN AT ELEV 220'-6⅛"

NOTE
ALL PLANS AT SCALE ⅛" = 1'-0"

NOTES
1. DISCONNECT & REMOVE THESE ILLUMINATED CLOCK NUMERALS PRIOR TO DEMOLITION AND REPLACE & RECONNECT SAME UPON COMPLETION OF CONSTRUCTION
2. DISCONNECT ALL ELECTRICAL ENERGY TO THE CLOCK TO PREVENT POSSIBLE INJURY DURING CONSTRUCTION

REVISED FEB. 23, 1966 - FOR ADDENDA #1

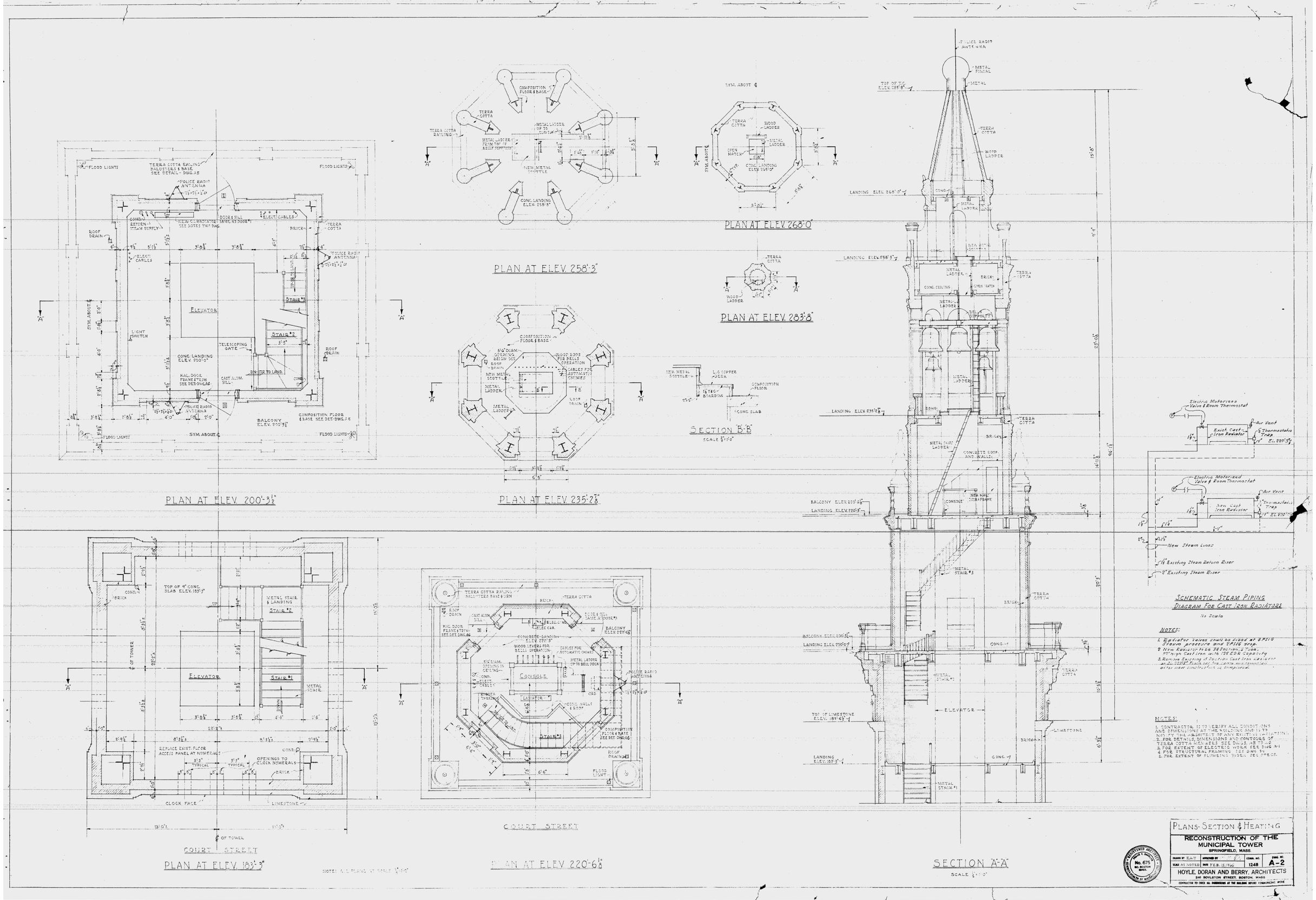
SITE PLAN & ELECTRIC PLANS

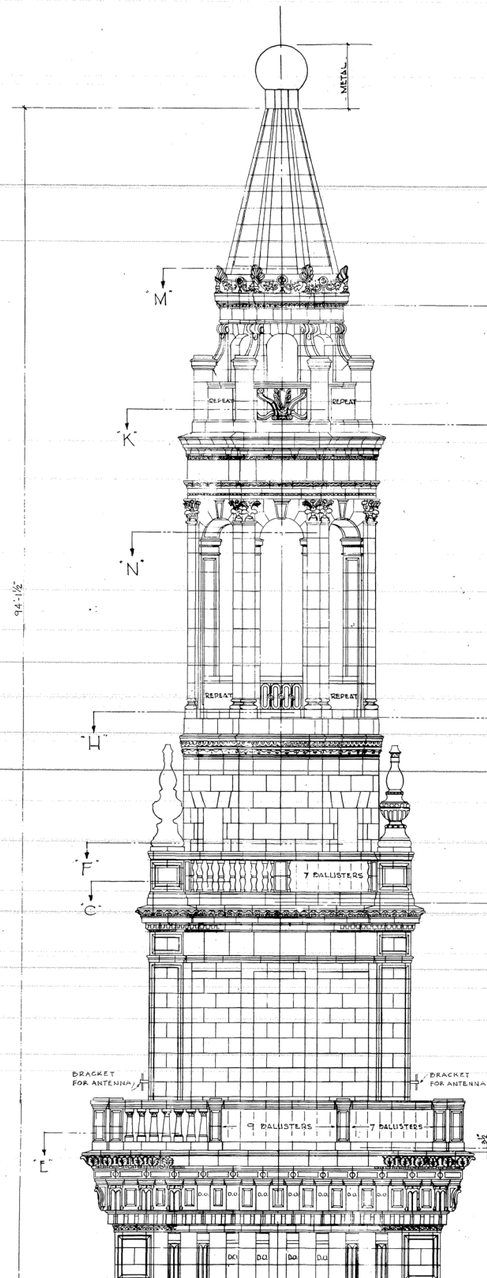
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.

DRAWN BY	APPROVED BY	CONTR. NO.	DWG. NO.
E.A.E.		1248	A-1
SCALE AS NOTED	DATE FEB. 15, 1966		

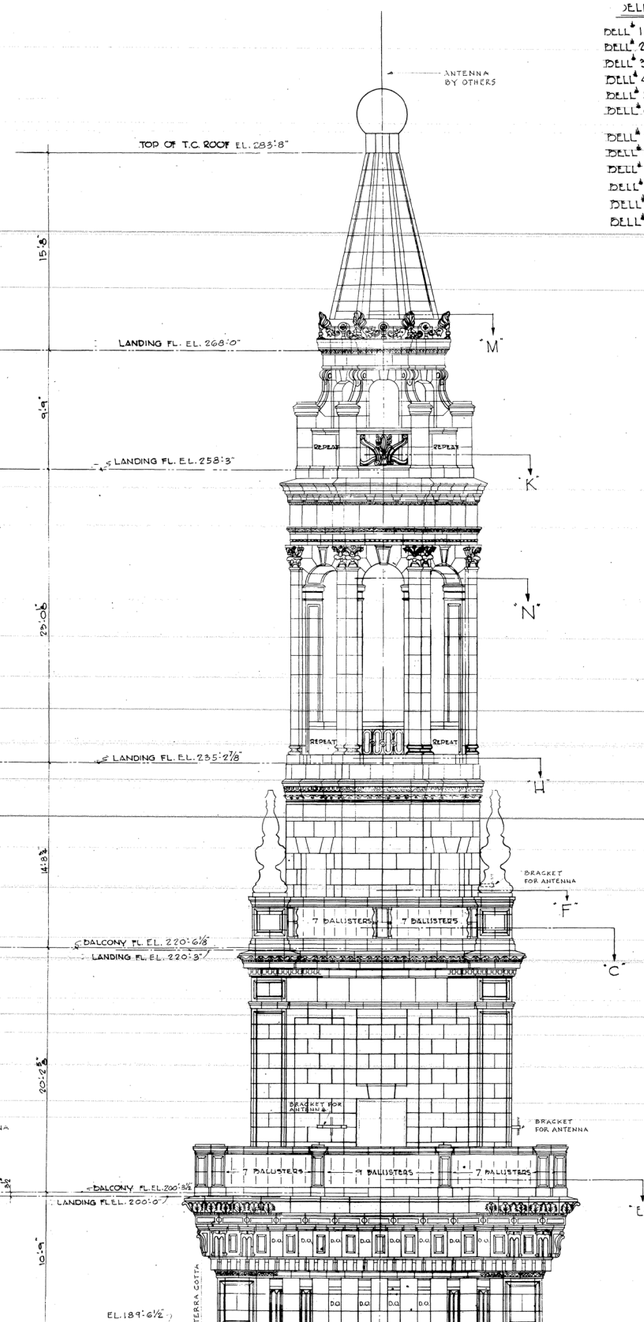
HOYLE, DORAN AND BERRY, ARCHITECTS
TEMPLETON STREET, BOSTON, MASS

REGISTERED ARCHITECT No. 675 BO. BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS


PLAN AT ELEV. 200'-3½"
PLAN AT ELEV. 235'-2⅞"
PLAN AT ELEV. 258'-3"
PLAN AT ELEV. 268'-0"
PLAN AT ELEV. 283'-8"
SECTION B-B
SCALE ¾"=1'-0"
SECTION A-A
SCALE ¼"=1'-0"
PLAN AT ELEV. 183'-3"
PLAN AT ELEV. 220'-6⅛"
COURT STREET
COURT STREET
NOTE: ALL PLANS AT SCALE ⅛"=1'-0"
SCHEMATIC STEAM PIPING DIAGRAM FOR CAST IRON RADIATORS
No Scale
NOTES:
1. Radiator Valves shall be sized at 8 PSIG Steam pressure and 3 PSIG drop.
2. New Radiator Has 38 Sections, 2 Tube, 20" high Cast Iron with 125 EDR Capacity
3. Remove Existing 38 Section Cast Iron Radiator and Install Each of the New Radiators in Exist. Location. Connections to Remain.
NOTES:
1. CONTRACTOR IS TO VERIFY ALL CONDITIONS AND DIMENSIONS AT THE BUILDING AND IN NO EVENT THE ARCHITECT OF ANY SUCH INVESTIGATION.
2. FOR DETAILS, DIMENSIONS AND CONTOURS OF TERRA COTTA MEMBERS SEE DWGS. 48 TO 48
3. FOR EXTENT OF ELECTRIC WORK SEE DWG A-1
4. FOR STRUCTURAL FRAMING SEE DWG. S-1
5. FOR EXTENT OF PLUMBING WORK SEE SPECS.
PLANS-SECTION & HEATING
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.
DRAWN BY E.A.T.
APPROVED BY
COMM. NO. 1248
DWG. NO. A-2
SCALE AS NOTED
DATE FEB. 15, 1946
HOYLE, DORAN AND BERRY, ARCHITECTS
246 BOYLSTON STREET, BOSTON, MASS.
CONTRACTOR TO CHECK ALL DIMENSIONS AT THE BUILDING BEFORE COMMENCING WORK
REGISTERED ARCHITECT No. 675 BO. BOSTON MASS.
COMMONWEALTH OF MASSACHUSETTS



SIDE ELEV.



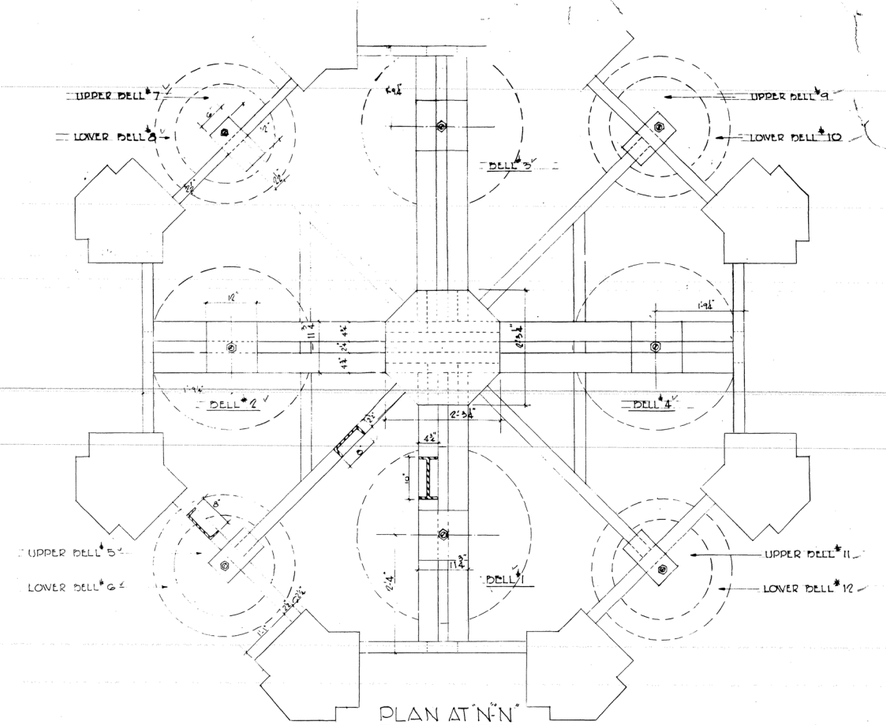
COURT ST. ELEV.

SCALE 1/4" = 1'-0"

BELL IDENTIFICATION & INSCRIPTIONS

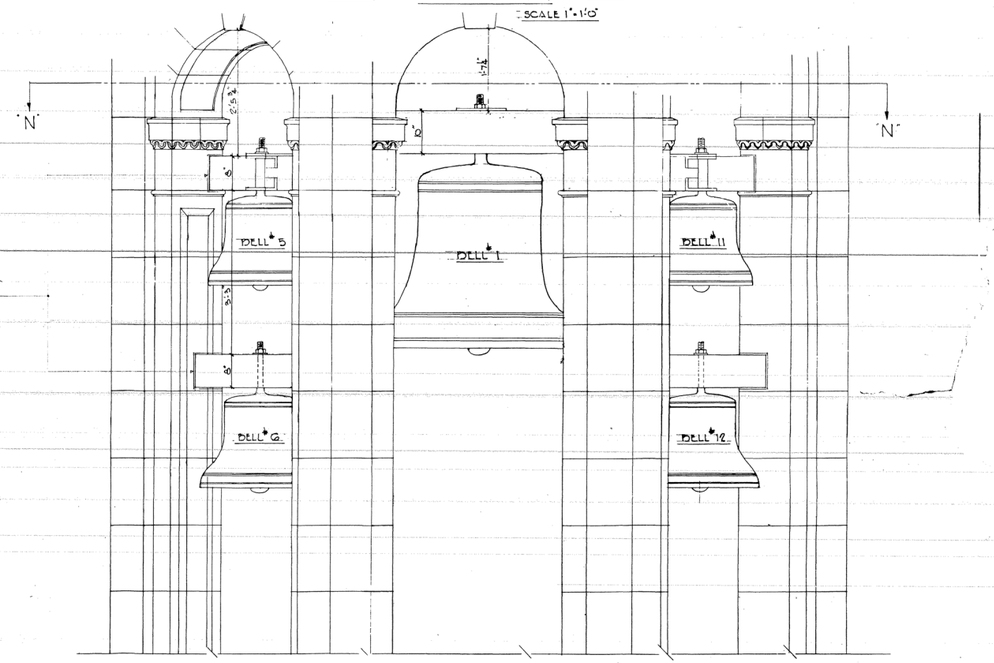
BELL #1 - "CITY HALL, SPRINGFIELD"
BELL #2 - "CHILDREN OF THE PUBLIC SCHOOLS"
BELL #3 - "CITIZENS OF SPRINGFIELD"
BELL #4 - "SPRINGFIELD BOARD OF TRADE"
BELL #5 - "WILBUR FENDLON YOUNG"
BELL #6 - "F. LIVINGSTON PELL AND HARVEY WILLEY, CORBETT, ARCHITECTS"
BELL #7 - "NEWELL AND SONS"
BELL #8 - "CITIZENS OF SPRINGFIELD"
BELL #9 - "L.W. DESSER FAMILY"
BELL #10 - "MRS. WALTER H. WESSON"
BELL #11 - "GEORGE M. HENDEE"
BELL #12 - "MIRIAM KELLOGG PRATT AND GEORGE DWIGHT PRATT"

SILICONE RUBBER COMPOUND JOINT STEEL TO T.C. TYPICAL



PLAN AT "N-N"

SCALE 1" = 1'-0"



FRONT (COURT ST.) ELEV.

SCALE 1" = 1'-0"

SIDE & COURT ST. ELEV'S
DETS OF SUPPORTS FOR BELLS

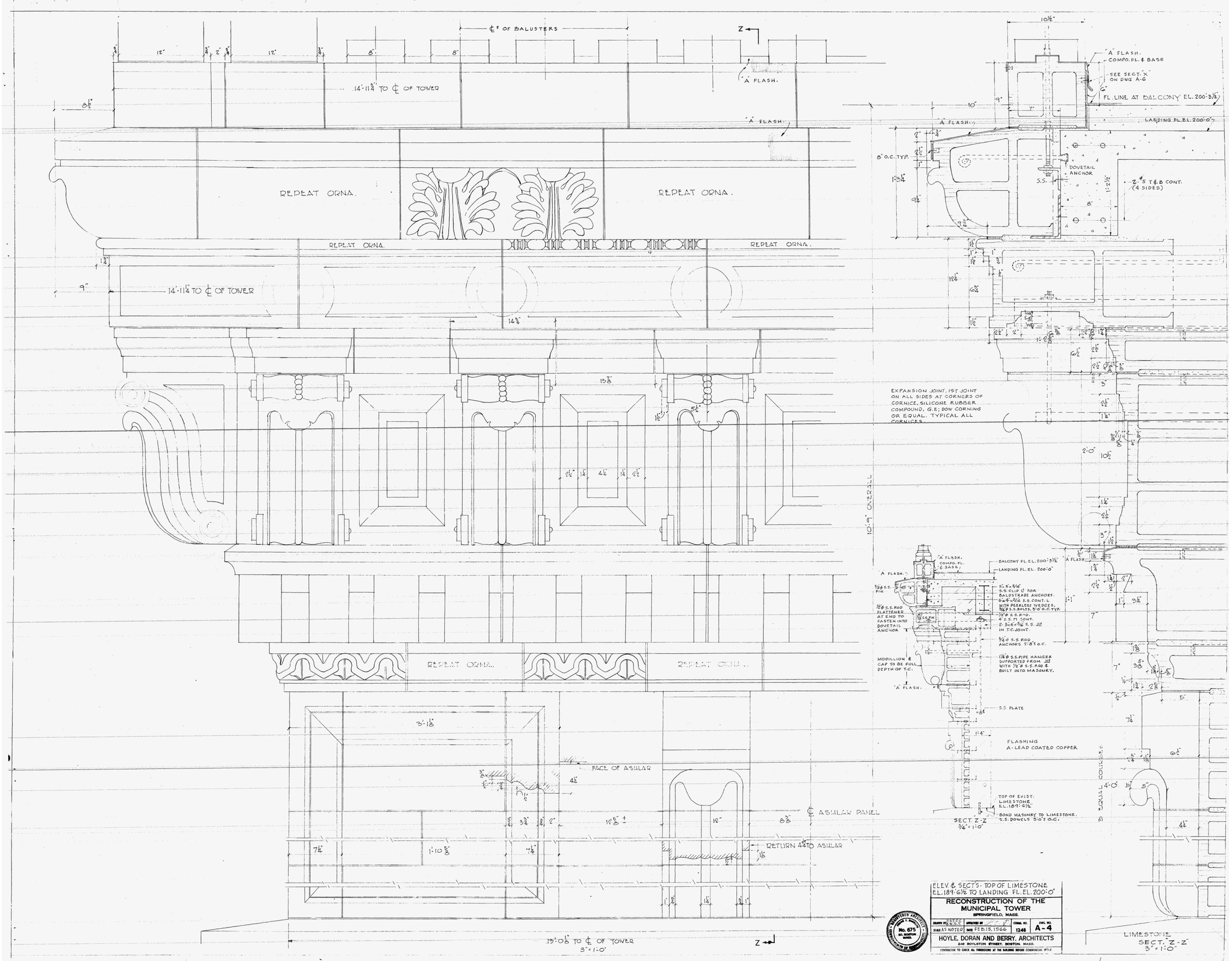
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.

DRAWN BY R.T.C. / E.D.S.	APPROVED BY	COMM. NO. 1248	DWG. NO. A-3
SCALE AS NOTED	DATE FEB. 15, 1966		

HOYLE, DORAN AND BERRY, ARCHITECTS
248 BOYLSTON STREET, BOSTON, MASS.

CONTRACTOR TO CHECK ALL DIMENSIONS AT THE BUILDING BEFORE COMMENCING WORK

REGISTERED ARCHITECT No. 675 BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS



ELEV. & SECT'S - TOP OF LIMESTONE EL. 189'-6½" TO LANDING FL. EL. 200'-0"

RECONSTRUCTION OF THE MUNICIPAL TOWER

SPRINGFIELD, MASS.

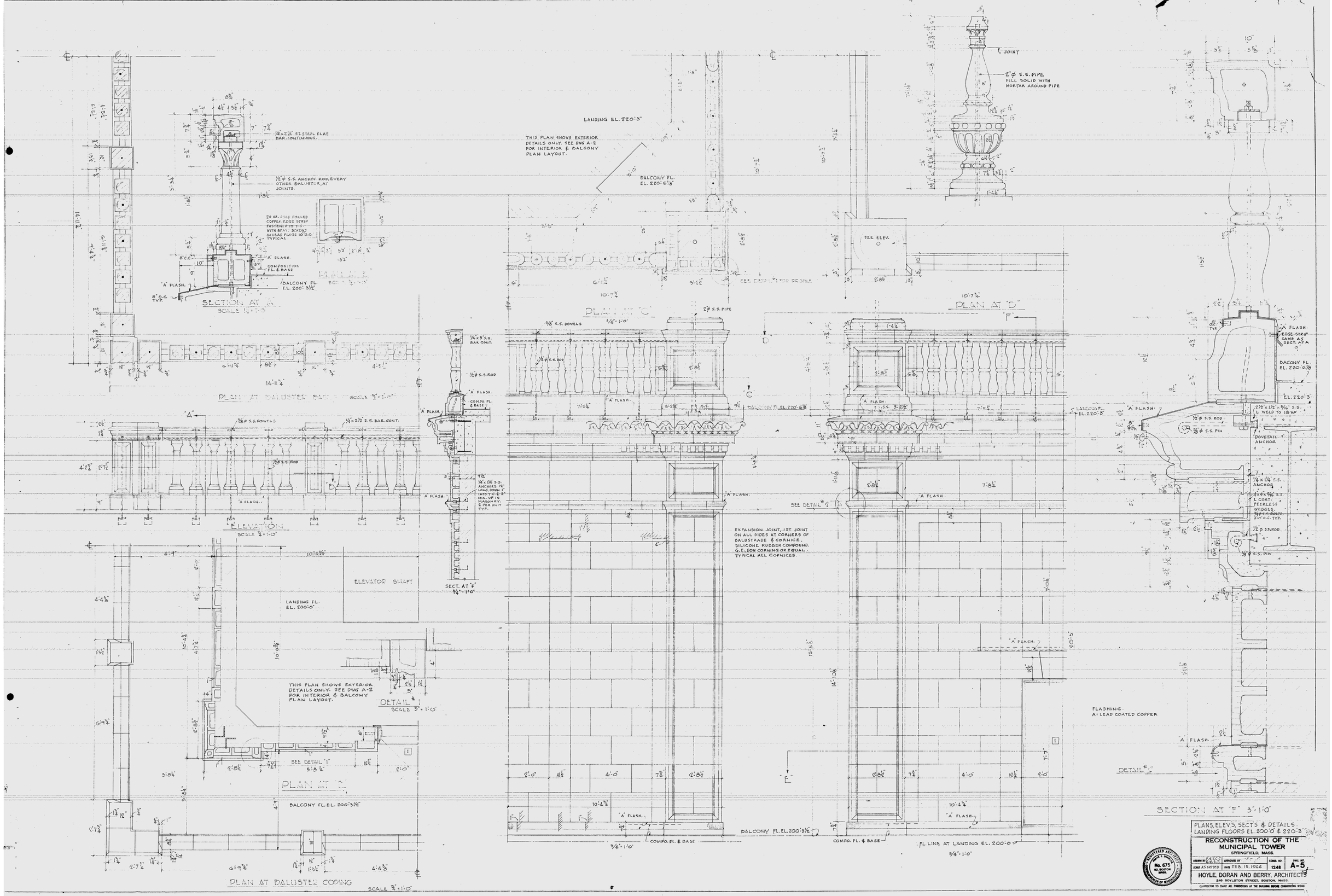
DRAWN BY	APPROVED BY	CONTR. NO.	DWG. NO.
E.S.I.C.C. & N.J.C.		1248	A-4
SCALE AS NOTED	DATE FEB. 15, 1966		

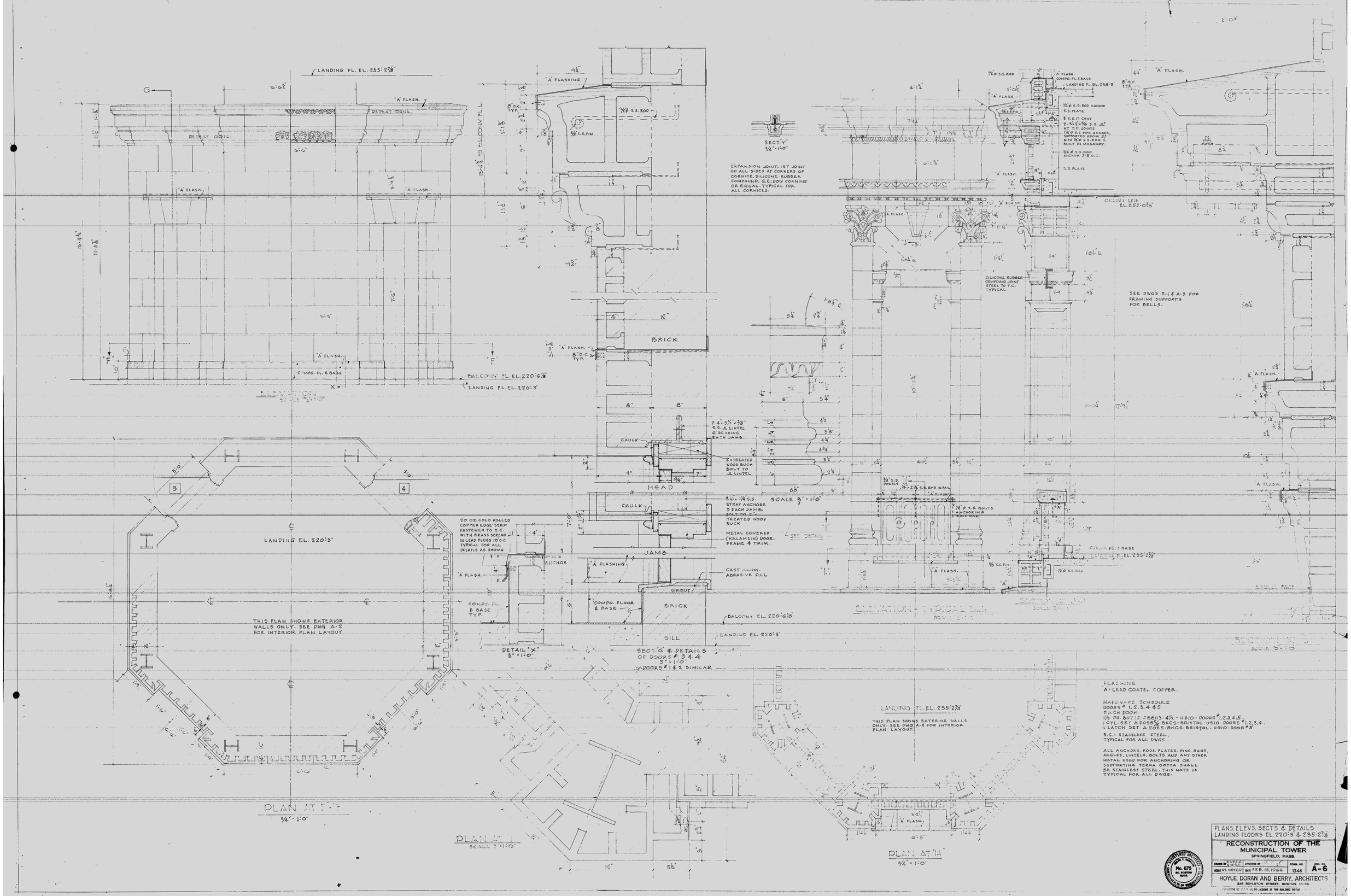
No. 675 MASSACHUSETTS REGISTERED ARCHITECT

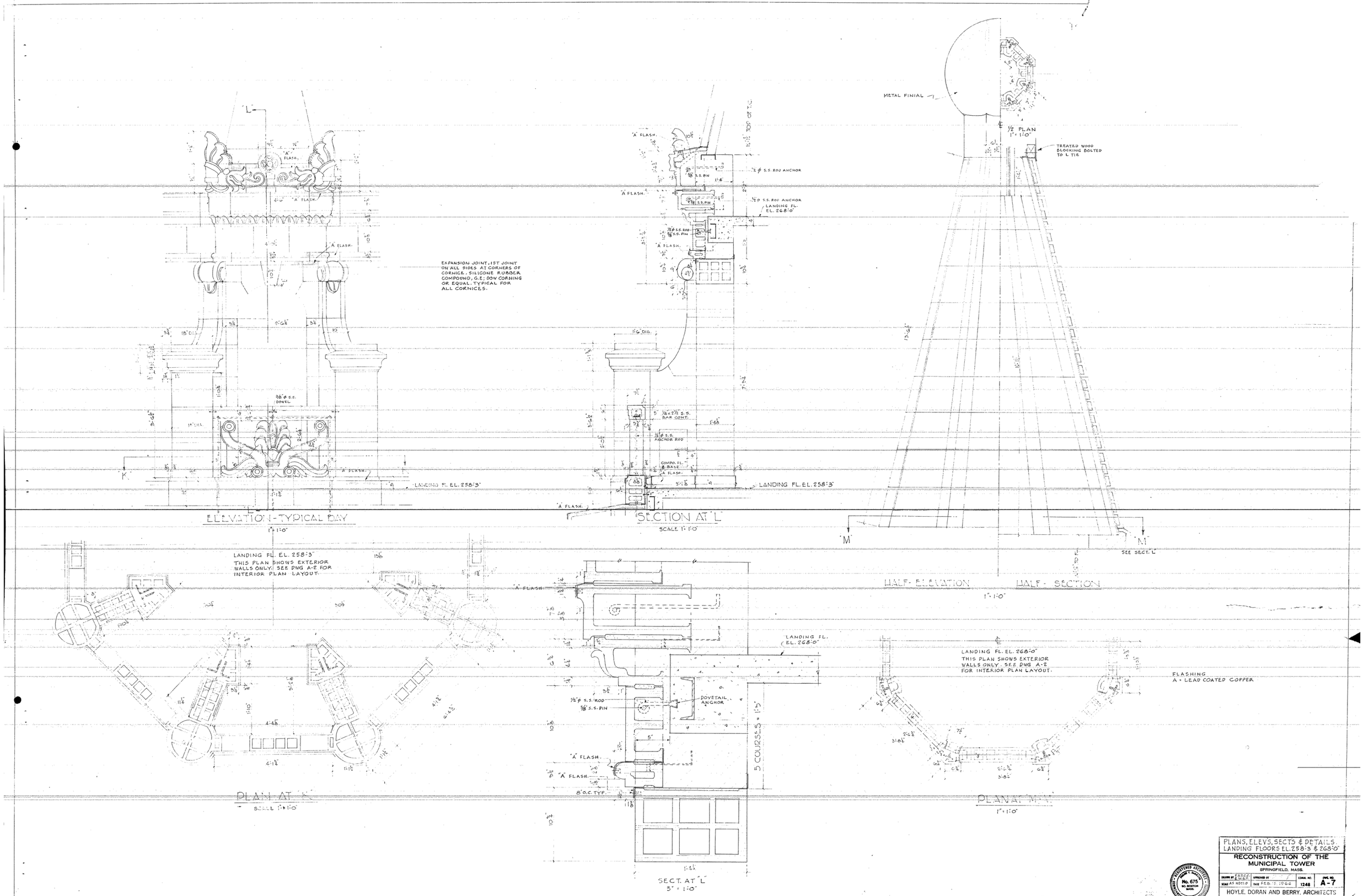
HOYLE, DORAN AND BERRY, ARCHITECTS

248 BOYLSTON STREET, BOSTON, MASS.

CONTRACTOR TO CHECK ALL DIMENSIONS AT THE BUILDING BEFORE COMMENCING WORK


SECTION AT 'A'
SCALE 1"=1'-0"
PLAN AT BALUSTER PAD
SCALE 3/4"=1'-0"
ELEVATION
SCALE 3/4"=1'-0"
PLAN AT BALUSTER COPING
SCALE 3/4"=1'-0"
ELEVATOR SHAFT
LANDING FL. EL. 200'-0"
THIS PLAN SHOWS EXTERIOR DETAILS ONLY. SEE DWG A-2 FOR INTERIOR & BALCONY PLAN LAYOUT.
DETAIL
SCALE 3"=1'-0"
PLAN AT 'E'
BALCONY FL. EL. 200'-3 1/2"
SECT. AT 'F'
3/4"=1'-0"
LANDING EL. 220'-3"
THIS PLAN SHOWS EXTERIOR DETAILS ONLY. SEE DWG A-2 FOR INTERIOR & BALCONY PLAN LAYOUT.
BALCONY FL. EL. 220'-6 1/8"
PLAN AT 'C'
3/4"=1'-0"
EXPANSION JOINT, 1ST. JOINT ON ALL SIDES AT CORNERS OF BALUSTRADE & CORNICE, SILICONE RUBBER COMPOUND, G.E., DOW CORNING OR EQUAL. TYPICAL ALL CORNICES
PLAN AT 'D'
3/4"=1'-0"
FL. LINE AT LANDING EL. 200'-0"
SECTION AT 'F' 3"=1'-0"
FLASHING. A' LEAD COATED COPPER
DETAIL
PLANS, ELEVS, SECTS & DETAILS
LANDING FLOORS EL. 200'-0" & 220'-3"
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.
DRAWN BY
APPROVED BY
SCALE AS NOTED
DATE FEB. 15, 1966
CONTR. NO. 1248
DWG. NO. A-5
HOYLE, DORAN AND BERRY, ARCHITECTS
248 BOYLSTON STREET, BOSTON, MASS.
REGISTERED ARCHITECT No. 675 BO. BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS


LANDING FL. EL. 235'-2 7/8"
"A" FLASH.
REPEAT DBNA.
"A" FLASHING
1/2" ø S.S. ROD
5/8" S.S. PIN
BALCONY FL. EL. 220'-6 1/8"
LANDING FL. EL. 220'-3"
COMPO. FL. & BASE
ELEVATION
SECT. Y
3/4" = 1'-0"
EXPANSION JOINT. 1ST JOINT ON ALL SIDES AT CORNERS OF CORNICE, SILICONE RUBBER COMPOUND, G.E. DOW CORNING OR EQUAL. TYPICAL FOR ALL CORNICES.
"A" FLASH. COMPO. FL. & BASE
LANDING FL. EL. 258'-8"
1/2" ø S.S. ROD ANCHOR
S.S. PLATE
3 S.S. FT CONT.
2 - 3/4" x 3/16" S.S. JL AT T.C. JOINTS
1 1/4" ø S.S. PIPE HANGER, SUPPORTED FROM 22" WITH 1/2" ø S.S. ROD & BUILT IN MASONRY.
3/4" ø S.S. ROD ANCHOR 2'-3" O.C.
S.S. PLATE
CEILING LINE EL. 253'-0 3/8"
SILICONE RUBBER COMPOUND JOINT STEEL TO T.C. TYPICAL
SEE DWG'S S-1 & A-3 FOR FRAMING SUPPORTS FOR BELLS.
BRICK
8" O.C. TYP.
CAULK
2 - 3 1/2" x 3/8" S.S. JL LINTEL & BEARING EACH JAMB.
2" x TREATED WOOD BUCK BOLT TO JL LINTEL
HEAD
SCALE 3" = 1'-0"
3/16" x 1 1/4" S.S. STRAP ANCHORS, 3 EACH JAMB. BOLT TO 2" x TREATED WOOD BUCK
METAL COVERED (KALAMEIN) DOOR, FRAME & TRIM.
JAMB
CAST ALUM. ABRASIVE SILL
GROUT
SILL
BALCONY EL. 220'-6 1/8"
LANDING EL. 220'-3"
SECT. G & DETAILS OF DOORS # 3 & 4
3" = 1'-0"
DOORS # 1 & 2 SIMILAR
20 OZ. COLD ROLLED COPPER EDGE STRIP FASTENED TO T.C. WITH BRASS SCREWS IN LEAD PLUGS 10" O.C. TYPICAL FOR ALL DETAILS AS SHOWN
ANCHOR
COMPO. FL. & BASE TYP.
DETAIL "X"
3" = 1'-0"
THIS PLAN SHOWS EXTERIOR WALLS ONLY. SEE DWG A-2 FOR INTERIOR PLAN LAYOUT.
PLAN AT F-F
3/4" = 1'-0"
PLAN AT 1
SCALE 3" = 1'-0"
LANDING FL. EL. 235'-2 7/8"
THIS PLAN SHOWS EXTERIOR WALLS ONLY. SEE DWG A-2 FOR INTERIOR PLAN LAYOUT.
PLAN AT 1-1
3/4" = 1'-0"
FLASHING
A - LEAD COATED COPPER.
HARDWARE SCHEDULE
DOORS # 1, 2, 3, 4 & 5
EACH DOOR
1 1/2 PR. BUTTS FBB113-4 1/2 - US10 - DOORS # 1, 2, 3, 4, 5.
1 CYL. SET A2058 5/8 - BKCS - BRISTOL - US10 - DOORS # 1, 2, 3, 4.
1 LATCH SET A2025 - BKCS - BRISTOL - US10 - DOOR # 5
S.S. - STAINLESS STEEL.
TYPICAL FOR ALL DWGS
ALL ANCHORS, RODS, PLATES, PINS, BARS, ANGLES, LINTELS, BOLTS AND ANY OTHER METAL USED FOR ANCHORING OR SUPPORTING TERRA COTTA SHALL BE STAINLESS STEEL. THIS NOTE IS TYPICAL FOR ALL DWGS.
PLANS, ELEVS, SECTS & DETAILS
LANDING FLOORS EL. 220'-3" & 235'-2 7/8"
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.
DRAWN BY E.S.T.C.C. S.S.
APPROVED BY
SCALE AS NOTED
DATE FEB. 15, 1968
CONTR. NO. 1248
DWG. NO. A-6
HOYLE, DORAN AND BERRY, ARCHITECTS
248 BOYLSTON STREET, BOSTON, MASS.
REGISTERED ARCHITECTS
No. 675
BOSTON, MASS.
COMMONWEALTH OF MASSACHUSETTS



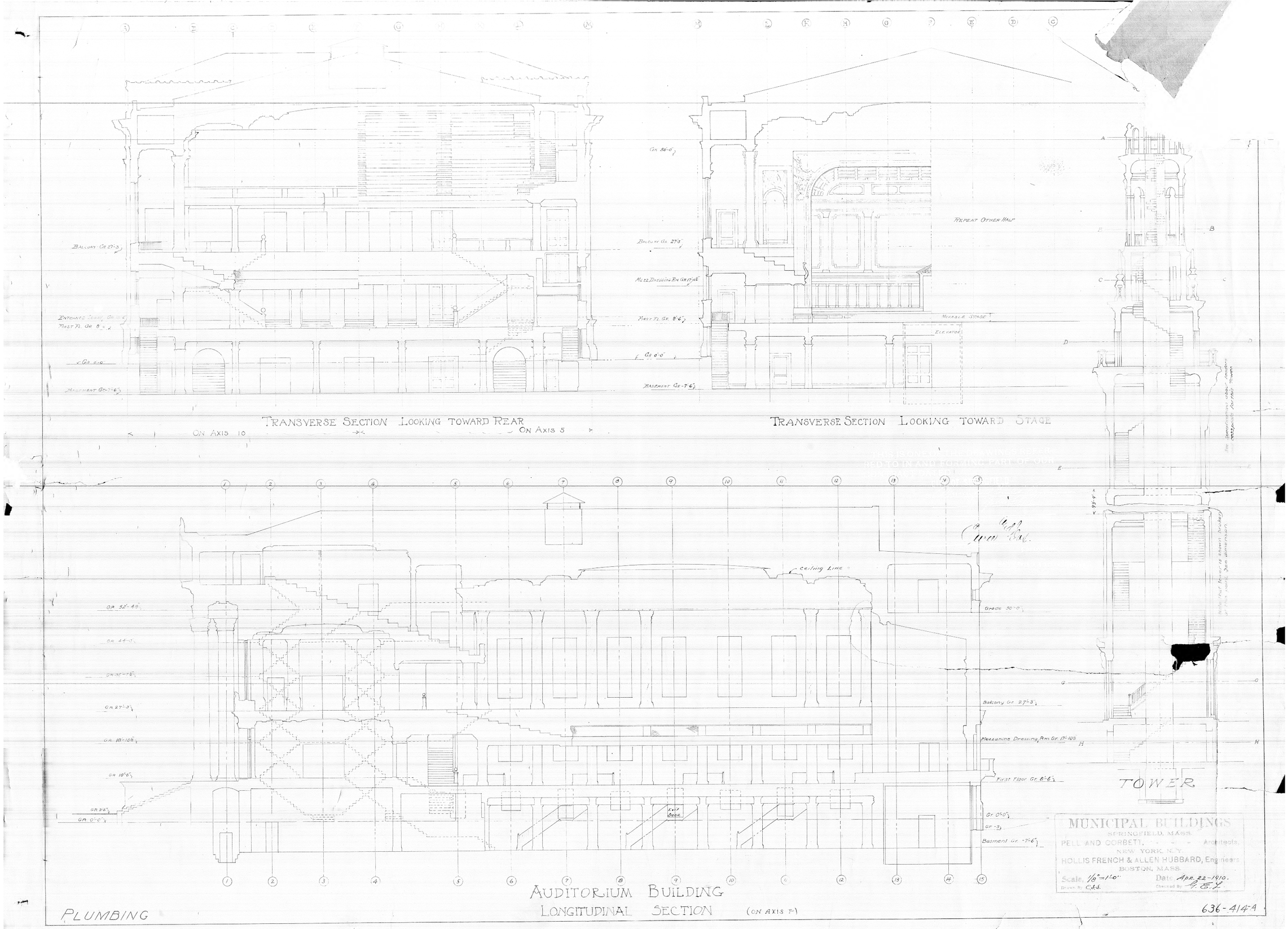
PLANS, ELEVS, SECTS & DETAILS.
LANDING FLOORS EL. 258'-3" & 268'-0"

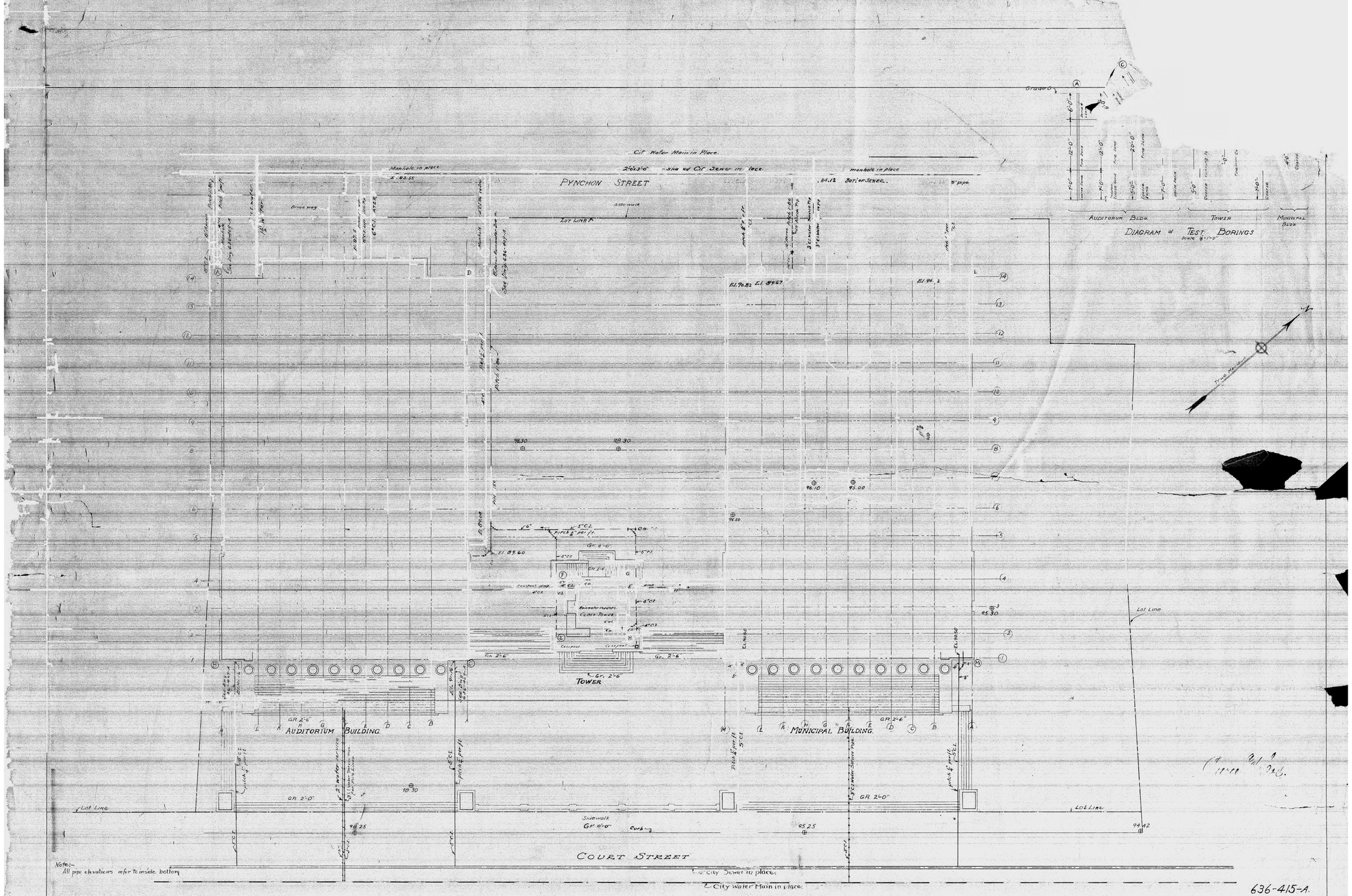
RECONSTRUCTION OF THE MUNICIPAL TOWER
SPRINGFIELD, MASS.

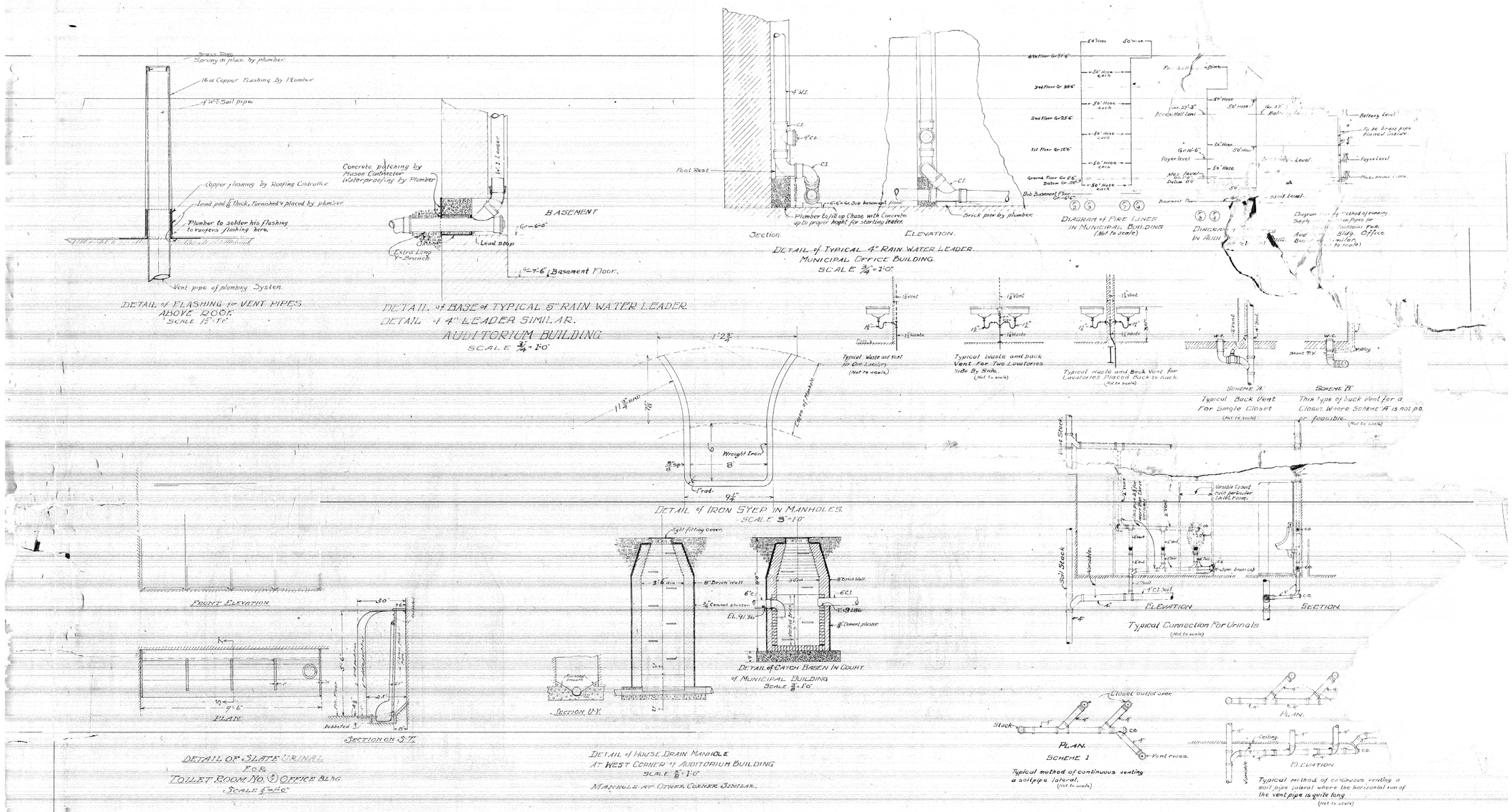
DRAWN BY E.S.T.C.C. & W.M.C.	APPROVED BY	CONTR. NO.	DWG. NO.
SCALE AS NOTED	DATE FEB. 15, 1966	1248	A-7

HOYLE, DORAN AND BERRY, ARCHITECTS
247 BOYLSTON STREET, BOSTON, MASS.

REGISTERED ARCHITECT No. 675 BO. BOSTON MASS. COMMONWEALTH OF MASSACHUSETTS


Balcony Gr. 27'-3"
Entrance Lobby Gr. 8'-6"
First Fl. Gr. 8'-6"
Gr. 0'-0"
Basement Gr. -7'-6"
TRANSVERSE SECTION LOOKING TOWARD REAR
ON AXIS 10
Gr. 56'-0"
Balcony Gr. 27'-3"
Mezz. Dressing Rm. Gr. 17'-10½"
First Fl. Gr. 8'-6"
Gr. 0'-0"
Basement Gr. -7'-6"
REPEAT OTHER HALF
MOVABLE STAGE
ELEVATOR
TRANSVERSE SECTION LOOKING TOWARD STAGE
ON AXIS 5
Gr. 52'-4½"
Gr. 44'-0"
Gr. 35'-7½"
Gr. 27'-3"
Gr. 18'-10½"
Gr. 10'-6"
Gr. 2'-6"
Gr. 0'-0"
ceiling Line
Grade 30'-0"
Balcony Gr. 27'-3"
Mezzanine Dressing Rm. Gr. 17'-10½"
First Floor Gr. 8'-6"
Gr. 0'-0"
Gr. -3"
Basement Gr. -7'-6"
EXIT DOOR
TOWER
Note: that tower is shown hatched at this wall. See dimension.
MUNICIPAL BUILDINGS
SPRINGFIELD, MASS.
PELL AND CORBETT, - - - - Architects,
NEW YORK, N.Y.
HOLLIS FRENCH & ALLEN HUBBARD, Engineers
BOSTON, MASS.
Scale, 1/8"=1'-0"
Drawn By C.J.S.
Date Apr. 22-1910.
Checked By
AUDITORIUM BUILDING
LONGITUDINAL SECTION (ON AXIS F)
PLUMBING
636-414-A


City Water Main in Place
Manhole in place
PYNCHON STREET
manhole in place
Drive way
Lot Line
Sidewalk
Grade 0
AUDITORIUM BLDG
TOWER
MUNICIPAL BLDG
DIAGRAM of TEST BORINGS
Scale 1/8"=1'-0"
True Meridian
El. 96.82
El. 96.67
El. 96.2
98.30
96.10
95.00
95.30
El. 89.60
Gr. 0'-0"
Gr. 2'-6"
Clock Tower
TOWER
AUDITORIUM BUILDING
MUNICIPAL BUILDING
Lot Line
Gr. 2'-0"
98.30
98.25
Sidewalk
Gr. 0'-0"
Curb
95.25
99.42
COURT STREET
City Sewer in place
City water Main in place
Note:-
All pipe elevations refer to inside bottom
636-415-A.
MUNICIPAL BUILDINGS
SPRINGFIELD, MASS.
PELL AND CORBETT, Architects,
NEW YORK, N. Y.
HOLLIS FRENCH & ALLEN HUBBARD, Engineers
BOSTON, MASS.
Scale 1/16"=1'-0"
Date APR. 22, 1910.
Note.
⊕ 96.25 Means present elevation of ground at the point where the circle is shown on the drawing
PLOT PLAN.
Scale 1/16"=1'-0"
Gr. 0.00 = City Datum 96.00
PLUMBING



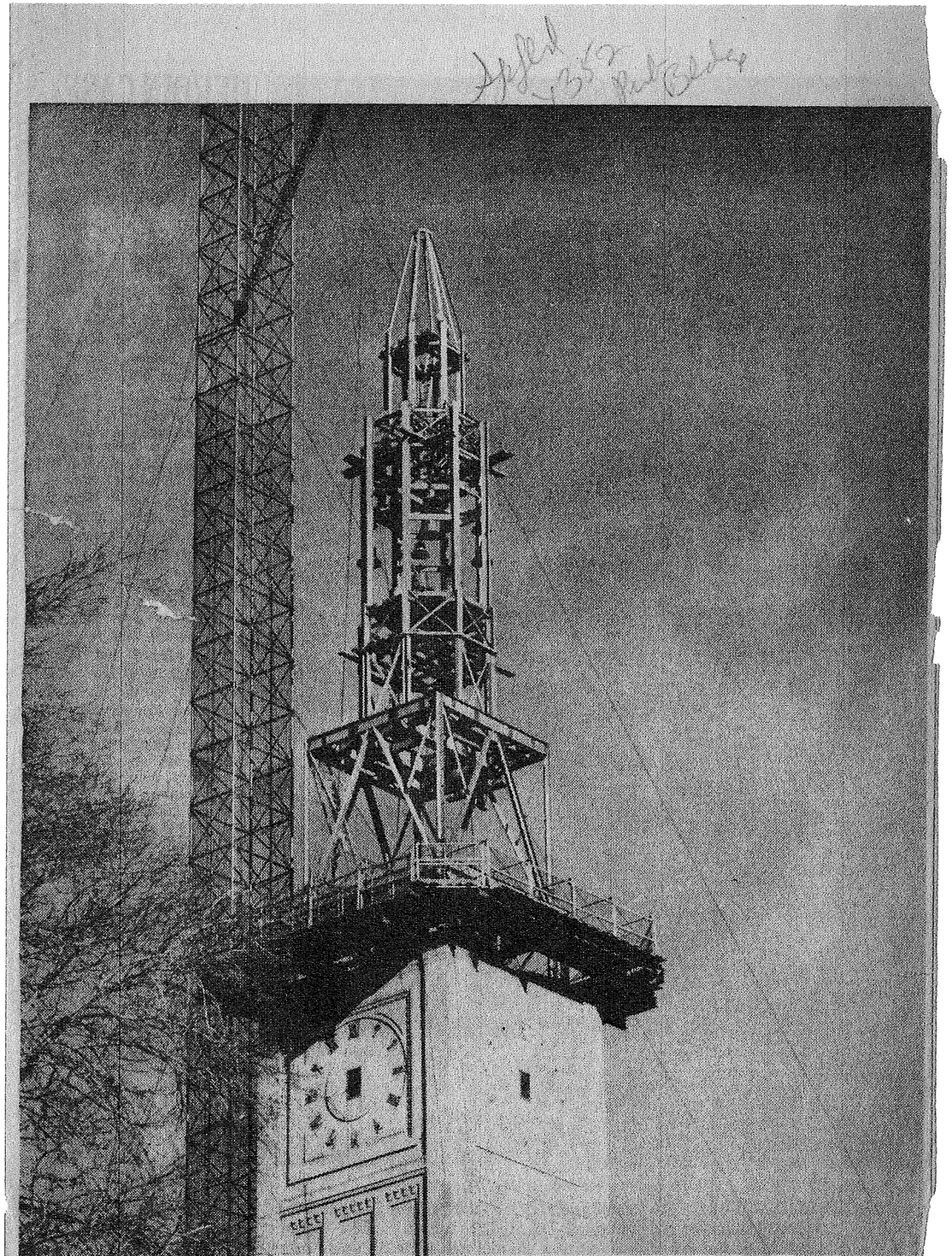
MISCELLANEOUS DETAILS.

MEACH & ALLEN
ARCHITECTS
NEW YORK
McKIM, MEAD & WHITE
NEW YORK
Miscel.
Apr. 5

News Clippings

Various Publications
Various Dates

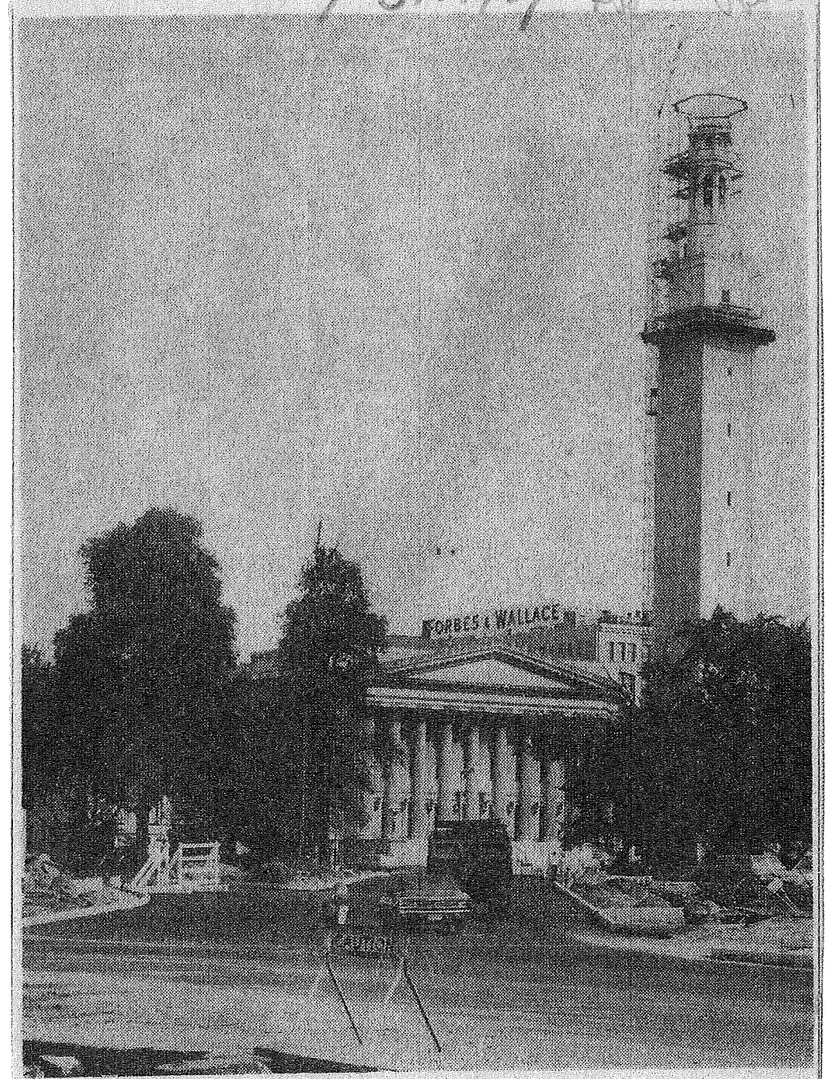
Picture from Real Photo Post Card
showing initial construction. Symphony Hall
+ Campanile built 1st, City Hall after.



BELLS ARE BACK—The difficult $650,000 repair job on the City Hall Campanile is now showing some visible progress as a new metal skeleton rises from the clock tower. Bells and the apparatus for operating them can be seen within the steel framework for the steeple structure. The construction project at the peak was hit by a fire today when a welder's torch ignited a piece of tarpaulin. The fire was quickly stopped.

1-18-1967

7-31-1967

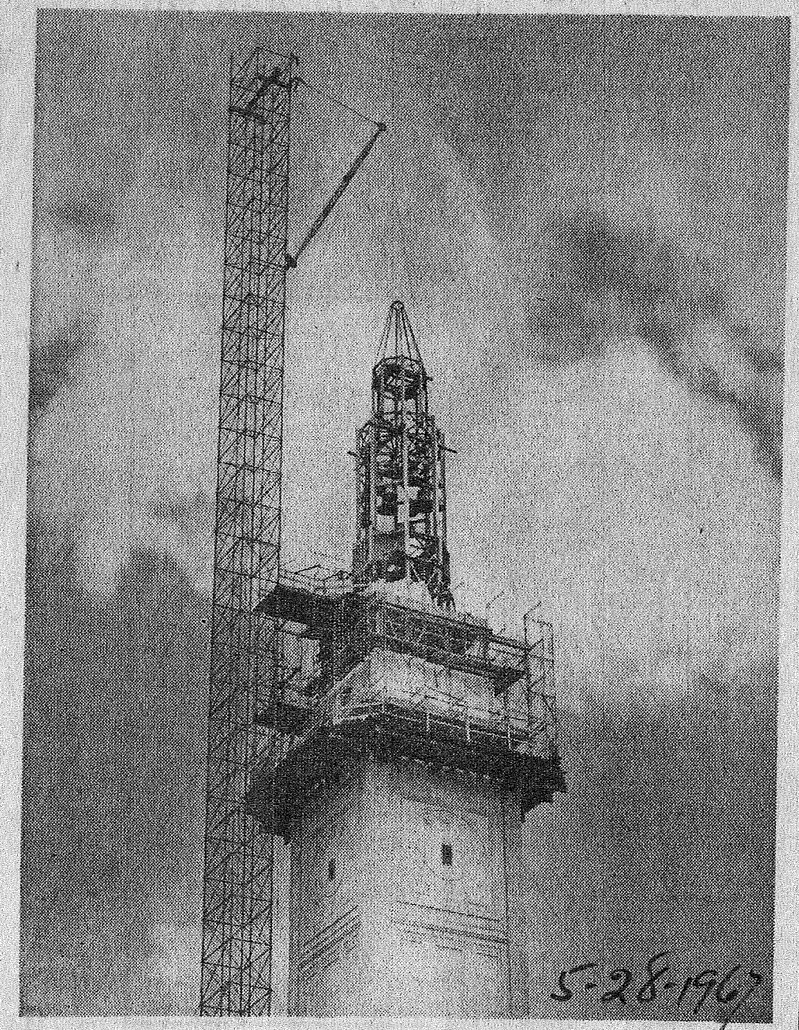


NEW FEATURES—Construction of the city's Campanile nears completion as construction workers on Interstate 91 finish work on new Broadway. To facilitate travel routes through the city, a new road was cut through Court Square, which connects with the old Broadway. Reconstruction of the Campanile is costing the taxpayers $650,000.

Tower Job Progresses

The $612,000 repair job on the city's campanile in the Municipal Group, which workmen for A. Bellanger and Sons, Inc., have been engaged with for over a year appears to be nearing completion. This photo taken Saturday shows all but the very peak of the 300-foot-high chime and clock tower completed. However, according to work schedules, it will probably be several months before the entire job, including interior work, is finished.

Getting the Tower Back in Shape

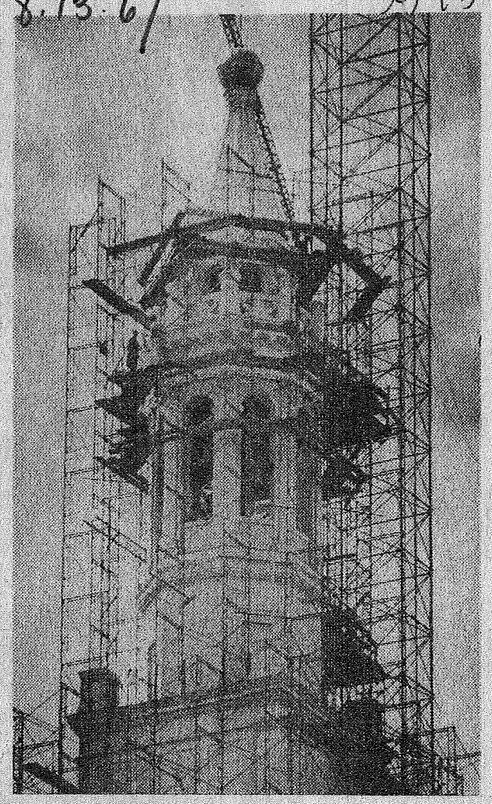


(Photo by Paul Krause)

Progress in the reconstruction of the top part of the Municipal Tower is shown in this photograph, taken from the roof of the District Courthouse. The tower was stripped down completely to the level of the top of the clock, and has been rebuilt. Dangerous deterioration of the original stonework, erected more than half a century ago, made the reconstruction necessary.

Tower Nearly Rebuilt

8.13.67



With the placement of the ball atop the Campanile by workmen of A. Belanger and Sons, Inc. this past week, exterior work on the 300-foot structure is all but completed. Still to be replaced are the four pairs of hands on the 14-foot diameter clock faces which grace each side of the 50-foot square monument in the center of the municipal group.

Municipal Buildings

Campanile Will Be Two-Toned Despite Spending of $650,000

9-5-67

About $650,000 has been spent to rehabilitate the Campanile, but when the project is completed it will be two-toned, according to Horace V. Sornborger, building superintendent.

The repaired top third of the structure, made of terra cotta, is white and the bottom, limestone part, is gray. "The whole thing should be cleaned," Sornborger said, "but there is no money available."

"If you cleaned the Campanile, you'd have to clean all the rest of the municipal buildings," he said. "Otherwise, they'd look terrible."

He had no estimate of the cost, but said, "It would be a great deal of money."

If the tower was cleaned, it could be either sandblasted, using very fine sand, or steam cleaned, Sornborger said.

The project, which was begun in June of 1966, is expected to be completed this October.

"The structure will be available for tours every afternoon from 2 to 4," Sornborger reported. "Interested persons or groups may inquire at the public buildings office." No tickets will be needed, he said, and the tour will be free.

An elevator will take sightseers to the observation deck of the 300-foot tower, where they will be able to see a panoramic view of the Connecticut Valley. From the deck, one can see 40 miles away on a clear day.

Voted After Hassle

After a lengthy hassle among City Council members, it was voted to spend the $650,000 for repairs in May of 1966. The hefty bill had been tabled by the council that April after councilors questioned whether there was a cheaper way to fix the tower.

At the time, wisecracking councilors suggested that the 50-year-old city symbol be torn down, gold plated, chopped off at the top or left alone.

The tower which stands between City Hall and the Municipal Auditorium has been deteriorating noticeably in the past 10 years.

A. Belanger & Sons has been doing the renovation work.

Municipal Campanile's Face-Lifting Operation to Be Finished Shortly

Building

SPRINGFIELD VERTICAL FILE

U 10/27/67

Springfield's world-famous landmark, the campanile, will be its old self in about three weeks, authorities report.

Started in June, 1966

A $650,000 repair job which was started a year ago June, will be completed right on schedule, according to Eric Groves of Reading, superintendent for the A. Belanger Co. of Cambridge, the restoration contractors.

All of the detailed terra cotta work on the tower has been completed, he said, and all that remains is to complete the limestone repairs along the sides of the 300-foot structure, and restore the limestone steps.

While all this is going on, two steelworkers will continue to perch top the 326-foot steel hoist which was constructed alongside the tower, working their way down to the ground as they take the hoist apart, bar by bar and bolt by bolt. The hoist took some five weeks to erect, and will take almost as long to dismantle.

Groves said that the terra cotta was custom made by the Federal Seaboard Terra Cotta Co. of Perth Amboy, N. J., one of the few remaining manufacturers of terra cotta in the nation. Because of its high cost, it is rarely used in construction any longer.

The terra cotta was installed much as any ordinary stone, but it was the crumbling of the terra cotta because of water seepage that caused the $650 reconstruction job in the first place.

Replacing Slabs

Masons are now working on scaffolding about two-thirds of the way up the tower, installing "dutchmen"—replacing pieces of limestone which have rotted away. As soon as this part of the work is completed, and the stairs restored, the work will be done.

Interior floor repairs and paintings are also almost completed, and as soon as the hoist tower is dismantled low enough, the elevator will be reinstalled to the upper floors.

The hands of the four-side clock are ready to replace, Groves said, and the motor is in excellent working condition, so that downtown workers will soon be hearing the sounds of the campanile chiming out the hours once again.

The workmen who are dismantling the 326-foot hoist tower work out in the open on the framework, unbolting [illegible]

like Wednesday, the tower was swaying in the breeze, despite the net of guy wires, and one workman's hat went sailing in the breeze onto the roof of City Hall. They are connected by telephone with the ground as they work their way down.

Pride Wins Out

Reconstruction of the tow[illegible] was the subject of considerable controversy nearly two years ago, when it was first proposed, because of the exorbitant cost. But experts pointed out that the city's campanile was one of the finest in the world, the center of one of the great municipal groups in the country, and consultants reported that the longer repairs were delayed the more the job would cost.

Municipal pride finally won out, and the campanile repairs were started, so that future visitors and passers-by on Route 91 are assured of a historic view for years ahead.

Excavation work for the city's [illegible]

Building Chief Ready to Crack From 'Cracks'

Repl. 1352

By LINDA SITEMAN
Union Staff

Springfield Public Buildings Supt. Eugene A. Laino is used to cracks about "cracks" in the Campanile.

But he admitted he may crack if he hears it one more time.

The crack is not a crack, he said. It used to be a crack. Now it's a filled-in crack. Only the caulking compound makes it look like it's still a crack.

What appears to be a 25 to 30-foot long crack stretches vertically at the southeast corner, more than half-way up the clock tower Municipal Auditorium.

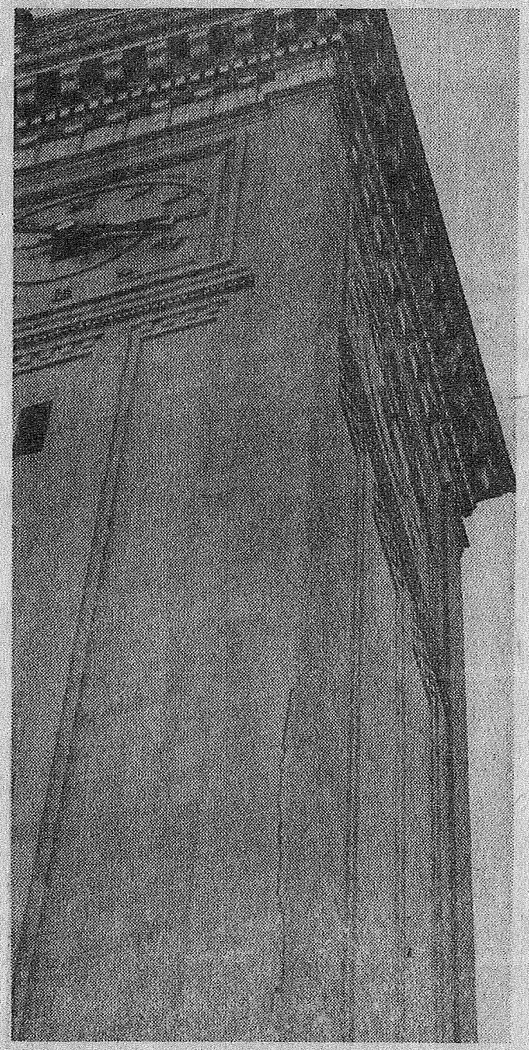
It has recently attracted notice, probably because of the damp weather. When it is wet, it tends to show up a little more, Laino said.

The 300-foot high structure is 60 years old. Speculation had arisen that demolition of the Main Street buildings at the corner of Court Square may have jarred the ground beneath the Campanile, causing the tower to crack.

Laino said he inspected the tower three weeks ago, and found no new structural damages. He said he would inspect it closely again today.

The tower underwent a $650,000 refurbishing in 1967 and 1968. The caulking [illegible] from white to a dark [illegible] exposure to the elements, but it has not eroded, he said.

Laino cracked a big smile, and said he would be sure to check the crack.



This is not a crack in the Springfield Campanile, it only looks that way. The city's building department superintendent said the caulking compound used to fill in the crack several years ago has darkened.

1985

Overhaul comissioned for oft

Repub. 11-3-85 pA-14

By SUSANNAH PUGH RUSSELL
City Hall reporter

Springfield's Campanile bells, which have malfunctioned as much as they have worked for years, are finally due to get a major overhaul.

City Planning Director David Moriarty said the chimes and the Campanile clock will get the attention they need with $150,000-$200,000 as part of a plan to create a second level park on a deck above the horseshoe-shaped parking lot behind the Campanile.

The deck will connect the municipal group by crossing Pynchon Street with the Monarch Place office-hotel-retail complex now being built.

Community Affairs Commissioner Judith A. Matt said, "We're going to try to get them done for the city's 350th birthday (next year), the complete restoration."

Moriarty said work will be funded through a grant from the state Heritage Park Program. "We're just waiting for the money to come in place."

The Campanile, a 300-foot tower that became the symbol of the city and is listed on the National Register of Historic Places, opened July 4, 1913. It stands between City Hall and Symphony Hall, and the three structures are known collectively as the municipal group.

One listener at the 1913 opening described the bells as ringing "gloriously."

Some 72 years later, the city's bellringer, Ruth Brick, complains that the bells sound anything but glorious.

PUBLIC BLDGS

ten-ailing Campanile bells

+ CHIMES

The bells produce 12 notes, but she says she rarely has all 12 notes to work with due to breakdowns in the electrical striking system.

"They have never worked properly since 1966 when . . . an electrical system was installed," Brick said. She said she has a letter from her predecessor, now deceased, saying he often could not play the bells for weeks at a time.

On Thursday, Brick said the system would produce no sound at all.

"The electricity was out. I don't know who pulled the plug," she said.

Brick said she was told that the bells would not be working again until New Year's Eve.

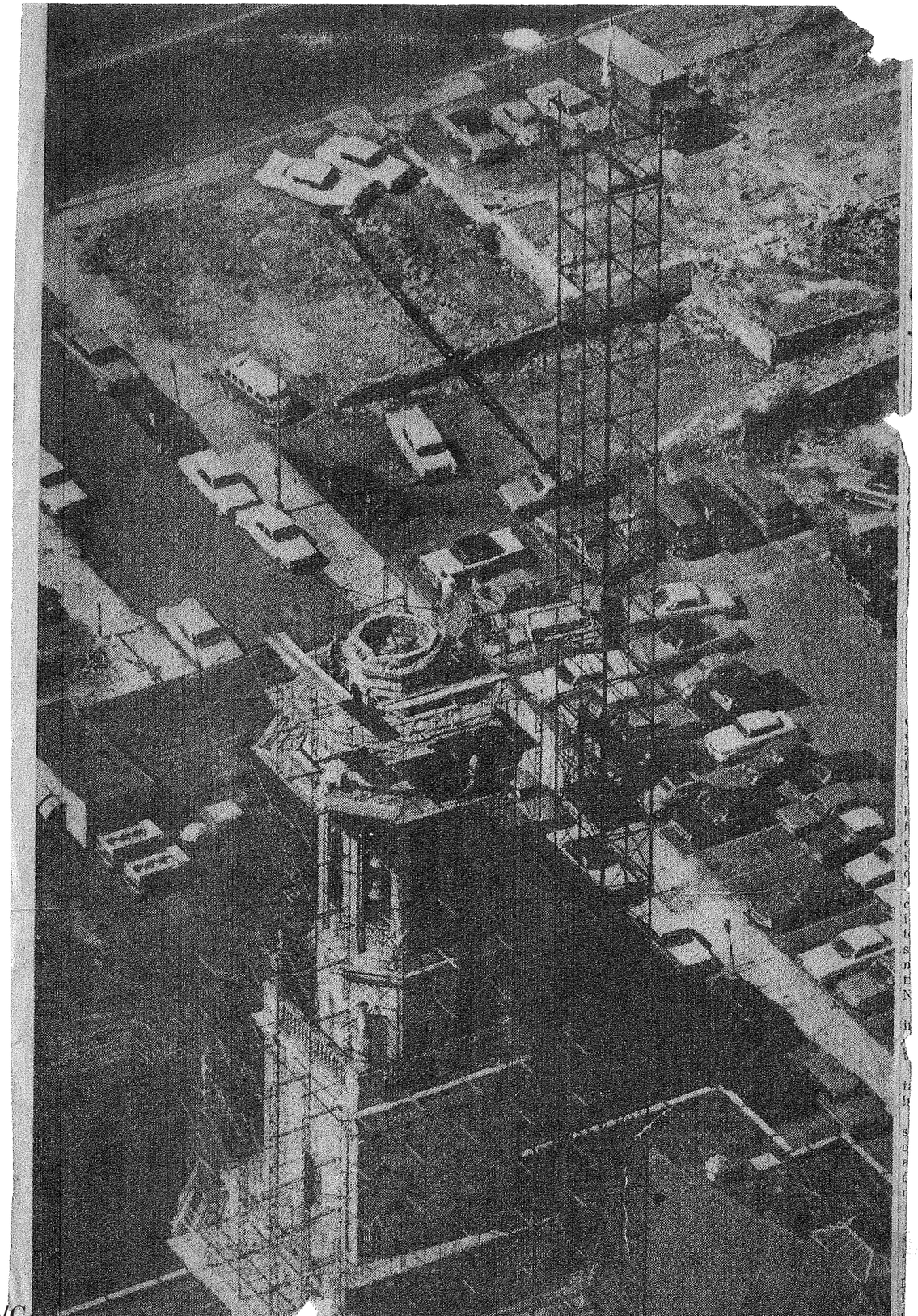
But Public Buildings Superintendent Eugene Laino said, "The bells will be on for Christmas and they will be on for New Year's. Positively, they will be working for the holidays.

"We've had a problem with them. You use them two or three times and the solenoids go," Laino said.

The solenoids create the electrical impulse that moves the striker to hit the bell, he said. But the system is so finicky that it needs to be completely redesigned, or a carillon should be installed.

He said he ordered the solenoids repaired yet another time this week.

"More than likely, they (electricians) turned off the electricity to make the repairs and they probably forgot to turn it back on," Laino said.

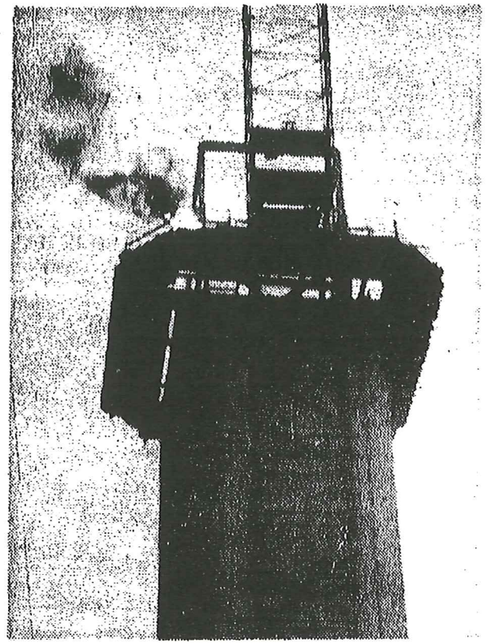


News Article

Link: https://www.genealogybank.com/doc/newspapers/image/v2%3A12AE9C35A497B0E8%40GB3NEWS-1303B45819DBA697%402439466-13024C161E7FA96C%400-13024C161E7FA96C%40

Date: 1966-12-06 Paper: Springfield Union Page: 1

Firemen Reach New Heights



City fire fighters rode to their greatest height Monday about 3.30 p. m. to extinguish a blazing gasoline generator on the scaffolding above the clock at the Campanile. The platform is 205 feet high, according to a spokesman for A. Belanger & Sons of Pittsfield, general contractors for repair work at the Campanile. Firemen under the direction of Acting Deputy Chief Robert S. Jennings rode up the elevator on the outside of the Campanile, carrying a carbon dioxide extinguisher with them. A booster line was carried aloft by a crane used in repair work at the Campanile. The generator, used in arc welding and owned by Pontiac Iron Works, Hyattsville, Md., was enveloped by flames and badly damaged, according to a fire official. No damage was reported to the platform, which surrounds the Campanile at the 150-foot level, just above the clock.

would they have records

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THE SPRINGFIELD MUNICIPAL GROUP

BY Jerrold B. Winer

FEATURES OF THE MUNICIPAL GROUP

Besides the utilitarian aspects of the Municipal Group, the buildings boasted many features. At a cost of $2 million, including furnishings, the City of Springfield had purchased 1,350,000 cubic feet of office space, plus an auditorium and convention center of the same size, and 125,000 cubic feet in the Campanile.

Basically, the construction of all three buildings is of steel and reinforced concrete, faced with Indiana limestone. Twenty-seven different types of marble from all parts of the world were used to provide the outstanding color combinations in the interior.

In addition, the finest decorative woods and talented woodcarvers were utilized to produce the panels anddecorative effects. The ceilings are intricately carved by plaster artists, and gilded in styles which even today produce comments and compliments.

Providing complete facilities for every city department, the architects even provided that the top floor, which was assigned to the city's engineering department, be additionally lighted by skylights. And the offices of the Tax Collector were equipped for many years like a banking room, with counter screens of marble and bronze.

The results of the exhaustive planning for the future are evident in the fact, that for the most part, City Hall's facilities are still fairly adequate. And, said Architecture Magazine "There is one beauty of the triple structure that does not appear on the surface.. it was honestly built".

SYMPHONY HALL (MUNICIPAL AUDITORIUM)

"I struck a chord and waited ... and the hall just sang to me."

Thus did Ignace Paderewski, world reknowned pianist-conductor, pay tribute to Springfield's Municipal Auditorium, which has been listed acoustically among the six best in the world.

Serge Koussevitzky, one of the hundreds of famous artists and conductors to perform here, commented that he "knew of no auditorium of its size in the world which could compare with it".

Among the famous performers heard in the hall have been the Boston Symphony, Cleveland Symphony, Lily Pons, Arthur Fiedler, Yehudi Menuhin, Yasha Heifitz, Jose Iturbi, Van Cliburn, Eugene Ormandy, Kirsten Flagstad, Patrice Munsell, Roberta Peters, Rise Stevens, Paul Robeson, Ezio Pinza, Robert Merrill and many, many others.

The Hall is the home of the Springfield Symphony Orchestra which each year presents an outstanding series of concerts and guest artists. Originally built with 4000 seats, the capacity was reduced to 3100 some years ago when more comfortable seats were installed.

The beautiful Mahogany room on the second floor is reknown for its sold mahogany paneling, gold-leaf ceiling, and huge Belgian crystal chandelier.

SPRINGFIELD VERTICAL FILE

THE BRONZE DOORS Municipal Buildings

Probably the most unusual but least-appreciated features of the Springfield Municipal group are the bronze-cast bas-relief doors on the front of the Administration Building, Symphony Hall, and the Campanile.

Often overlooked, the doors, in a series of 16 panels, tell the history of Springfield, and in six others, symbolize the city and what it stands for.

The doors were executed by sculptress Gail Sherman Corbett, when the committee became so excited with the beauty of the exterior during construction that it changed its plans from wooden doors and substituted the huge cast bronze bas-reliefs.

Both the Auditorium doors and the Administration doors show scenes from Springfield history, while the Campanile doors depict a man and woman of Springfield, the coat of arms of Massachusetts and of Springfield, plus the symbols of justice and the bee hive...symbol of a successful community, surrounded by the laurel of peace.

The entire Municipal Group was dedicated with appropriate two-day ceremonies on December 8 and 9, 1913, highlighted by the attendance as main speaker of President William Howard Taft, concerts by the Seventh Regiment Band, and the Philharmonic Orchestra, a dedication ball, chime concerts and a school children's program.

THE CAMPANILE

By far the most popular attraction of the group is The Campanile, which rises 300 feet to a bell tower which houses 12 bells of a carillon, played electrically on a regular schedule.

Oddly enough, the Campanile had to be lengthened an additional 25 feet during construction, when the architects found, despite their careful planning, that the tower was not high enough.

The tower leads to an observation deck, which is accessible by elevator. From the deck, one can see the surrounding countryside for a distance of some 29 miles. The Campanile is open to the public from 9:00 a.m.- 4:00 p.m. daily and also offers a spectacular view of the city.

The tower contains a clock, electrically illuminated, with a face 14 feet in diameter and a minute hand eleven feet long, and can be seen from 3 miles distance in good weather.

If you do not wish to use the elevator, the tower can be climbed by steps..343 to the chime deck!

The carillon contains 12 huge bells, weighing some 12,000 pounds in all, and ranging in size from the 3200 pound City of Springfield bell, a duplicate of the original bell in Town Hall, to the 225 - pound Newell Memorial Bell, in memory of Cyrus Newell and his sons, a well-known musical family of the city.

The bells were cast by Meneely Bell Company of Troy, New York, makers of the original bell, and are stationary. Only the clappers move when played from the electric keyboard in the base of the Campanile.

The tower cracked some years ago, and after some time was repaired in 1967, at a cost of $750,000, compared with the $1.8 million cost of the entire Municipal Group.

1947

Gerliep, the Human Fly, Starts Job Of Repairing the Campanile Tower

D News 8-13-47

Frank Gerliep, Chicopee Falls steeplejack, today started repairs to the tower of the Campanile under a contract awarded recently by the City Property Committee.

In addition to material, which must be furnished by the city, the job will cost $26,000. It will involve repairs to the tower which were neglected for many years until the City Property was forced for reasons of safety to take steps to correct the condition.

The area at the front and rear of the Campanile has been closed to the public for many months. Several chunks of terra cotta fell to the esplanade, causing the City Property Committee to rule the area unsafe for pedestrians. The parking area at the rear was closed at that time.

News Article

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Date: 1964-03-31 **Paper:** Springfield Union **Page:** 24

City Will Hire Engineers on Two Problems

Campanile Repair, Harriet St. Blocks, To Be Studied

Mayor Ryan Monday authorized the hiring of consulting engineers for a detailed study of structural damage to the Campanile, and the structural and soil conditions at 12 and 14 Harriet St. where two apartment buildings are tipping toward each other.

Will Provide Funds

Building Commissioner Francis J. Liberatori met with the mayor and submitted his request for consultants in two separate letters. Mayor Ryan said he would make available whatever funds were needed.

Liberatori told The Union he would begin contacting consulting engineers this week.

Earlier this month large chunks of rock fell from the tower of the 300-foot Campanile in the Municipal Group. Liberatori told the mayor that from the findings of a building inspector who examined the Campanile "we believe that a condition exists that may be dangerous to life and limb, and warrants a more thorough investigation than is possible by this department." He said the damage was caused "by the ravages of time and elements."

Repaired in '54

The last major overhaul to the 50-year-old Campanile was done in 1954. Mayor Ryan this year eliminated from the budget an $8000 request for repairs to the tower.

Liberatori told a reporter that his department has neither the equipment nor the manpower for a thorough examination. "We need an expert opinion," he added.

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Date: 1964-03-31 Paper: Springfield Union Page: 24

added.

His report to Mayor Ryan said an examination disclosed "excessive cracks and spalling in the limestone facing and cornice" on the exterior from the first balcony to the top of the tower. He noted, "Some of the facing and cornice work has recently fallen to the ground creating a dangerous condition to life and limb."

On the interior, "about midway between the first and second balcony bricks were removed to expose the diagonal structural steel bracing. Excessive corrosion of the steel members was disclosed and pieces of same were removed by hand. A large piece of the second balcony concrete floor slab has spalled, exposing corroded reinforcing steel."

The two four-story adjacent apartment buildings on Harriet St. have been gradually tipping toward each other for about 25 years. Board of Appeals has under consideration a petition for a zoning variance to enable the occupied buildings to be braced against each other.

Liberatori told the mayor a consulting engineer was recommended to "determine whether one or both of these buildings must be demolished, or if they may be safely braced against each other as proposed by Dr. Jacob Feld, consulting engineer (for the buildings' owners.)"

Liberatori told a reporter it was known that the soil is clay, but that he wanted "another man's opinion" on the proposed bracing.

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City Campanile Awaits Costly Repair Project

Municipal Buildings

Sptm 7-1-63

It is likely to be a startling sight to see the city's most elegant structure, the Campanile, bared to its steel skeleton next year for a costly major face lifting.

State of Decay

Earlier this month, Mayor Ryan announced that the 52-year-old tower is in a state of decay and in urgent need of repairs to cost $300,000. He said the tower will have to be stripped from the first balcony to the top where the weather has caused the stone and steel to crumple.

The mayor requested $25,000 from the City Council last week for initial work on the spire that involves a man slung over the side in a chair to measure each stone exactly before final plans for the reconstruction can be drawn.

A representative of the Boston firm of Hoyle, Moran and Berry told the councilors that the work will take about four months after the preliminary measurements are made. He said the structure was not protected from the elements with weatherproofing materials which are now common in modern construction.

Hailed in 1913

The Campanile and the two "Corinthian temples" it oversees (City Hall and Municipal Auditorium) were dedicated in December 1913 and hailed at the time as the finest municipal group in the country.

In January, 1908 the city appropriated $5000 for an architectural competition to design a city hall to replace the red

← Would they have records?

brick city hall that burned down in 1905.

By July the result was 82 designs with architects F. Livingston Pell and Harvey W. Corbett submitting the winning plan. Construction of the municipal group began in 1910 and the entire project was completed late in 1913.

The group is made of steel and reinforced concrete with Indiana limestone facing and set the city back $2 million. The Campanile, modeled after Italian Renaissance bell towers, measures 50 by 50 feet and is 300 feet high.

Tower Closed

An open elevator once took sightseers to the observation platform 201 feet above the sidewalk. Now, the tower is closed and barricades at the base prevent pedestrians from coming close enough to be struck by terra cotta flaking off the structure.

The original construction plans for the stately Campanile have been lost with only a portion of the blueprint in existence: one reason for the costly initial study of the structure before the reconstruction can begin.

In the early years of this contury the chimes, a carillon of 12 bells, were played by a chime ringer to welcome famous visitors to the city, honor the war dead of World War I and once in 1921 for a radio broadcast that was heard as far away as Alaska.

The bell chimer's task is no easy one. He must manipulate plowlike handles simultaneously with foot pedals to make chords on the bells which weigh as much as 3200 pounds.

It is reported that the view from the observation deck offers one of the most generous panoramas in New England with the dome of Hartford's capitol visible on a clear day, 25 miles away. But, probably its most valuable asset is its reputation as the symbol of Springfield.

May Rebuild Top Portion Of Campanile

MUNICIPAL BUILDINGS

Sp Union 10-12-65

Workmen Report Deterioration Of City Tower

SPRINGFIELD HISTORICAL FILE

As investigation of the Municipal Campanile continues, it is likely that the top third of the stately structure may have to be removed and rebuilt, it was learned Monday.

Masonry Deteriorated

An official from Hoyle, Moran and Berry of Boston, the firm hired to renovate the spire, said most of the masonry from the top of the clock to the top of the tower is deteriorated.

He said the crew that was sent up the Campanile to study the extent of the weather damage to the 52-year-old structure reported the steel structure, as well as the stone facing, must be replaced.

He explained that water creeps into the steel skeleton through the cracks in the stone facing and freezes in the winter, occasionally thawing and causing "movement."

He said when the tower was built, little was known about weather-proofing methods that would have protected the stone and steel from deterioration. He added that the structure is strong enough to remain standing for a long time, but as the stone is replaced the steel frame should be replaced too.

Proper Job Urged

He said replacing the stone without rebuilding the steel structure "would be like putting a clean shirt on over a dirty T-shirt." Three men have been working on the landmark for about a month.

It was reported that they are making measurements and drilling through the stone to test the steel beneath. The company representative said the major part of the investigation is completed, but the men will not finish on the tower for another 1½ months.

He said the information from the tests is being put together for a comprehensive report. He reported that after plans are drawn, work will begin on the tower next spring and will continue through next fall.

Last July, Mayor Ryan went to the City Council for the first of $300,000 when he learned that the Campanile was in a state of decay. It was believed at the time that only the stone facing needed replacement, although signs of weather-wear were noted on the steel.

It was reported then that the stone would be stripped fr the first balcony to the

Rosarie

'Hire Another Consultant For Campanile Repairs'

Municipal Buildings

Sep 35

DN 4-7-66

Councilor Sullivan Says City Should Get Another Outside Repair Estimate to Rebuild Top Third of Tower; Says Price Could Be Less Than $650,000 Proposed

SPRINGFIELD VERTICAL FILE

The city should hire another outside consultant to furnish advice on repairs to the Campanile.

This was the proposal today of Councilor John M. Sullivan who objected last night to a $650,000 financial transfer to provide repair money for the City Hall tower.

Councilor Sullivan said he feels it would make "good sense" to obtain another outside repair estimate since he feels rebuilding of the top third of the tower can be done at a lower price.

The objection last night to the financial order delayed a council vote on the repair money transfer to the next council meeting, the 18th.

Councilor Sullivan said he will investigate the possibility of bringing in a counter financial order then, to hire an outside architectural firm to give their views "on proper repair of the Campanile."

$25,000 Study

A $25,000 outside study was approved by the council last year, which engaged the Boston architectural firm of Hoyle, Doran, and Berry to make a detailed study of repair work needed at the tower.

The result of the survey was a report that rebuilding is required of the entire top section of the Campanile, from the tower clock to the top.

Councilor Sullivan said today he doesn't understand why a $300,000 estimate was given last year for tower repair, and the low bid for the work came in recently at double this amount at $612,000.

Based on what he termed a "fantastic amount" for the repair work, the councilor predicted total cost could reach $1 million before the project is completed.

A Cambridge firm, A. Belanger and Sons, Inc., was the low bidder for the tower. The only other bid was [illegible] 000, by Fontaine Bros [illegible] of this city.

The $650,000 order n[illegible] debated by the counci[illegible] transfer from city lan[illegible] funds received from th[illegible] council appr[illegible] today by Public Buildings Supt. H. B. Sornborger.

He said the contract with the Cambridge firm calls for 320 working days, and he pointed out that repair work can only be conducted in good weather. This rules out winter work, and repairs during windy or rainy weather, Mr. Sornborger noted. If the project started next month, it would thus take until 1967 to complete, he estimated.

Asked about the difference between the original estimate of $300,000 and the present bid price of over $600,000, he said the $300,000 figure was a "tentative" one, made by the Boston architectural firm before it made detailed tests of structural deterioration.

The public buildings chief said the $25,000 contract with the Boston firm is limited to that amount, and a higher repair price "is not to their advantage." Hoyle, Doran, and Berry will get no more than $25,000, he said, regardless of how much it costs to fix the tower.

Two Courses of Action

Building Commissioner Francis J. Liberatori commented that the city only has two courses of action: Repair the tower, or take down the top third of the structure.

He said the top third could be removed from an engineering standpoint, but "architecturally and esthetically, it would look terrible."

The tower has been closed to the public for more than a year. Mr. Liberatori said there is no question that the deteriorated tower is dangerous and something has to be done, for safety reasons.

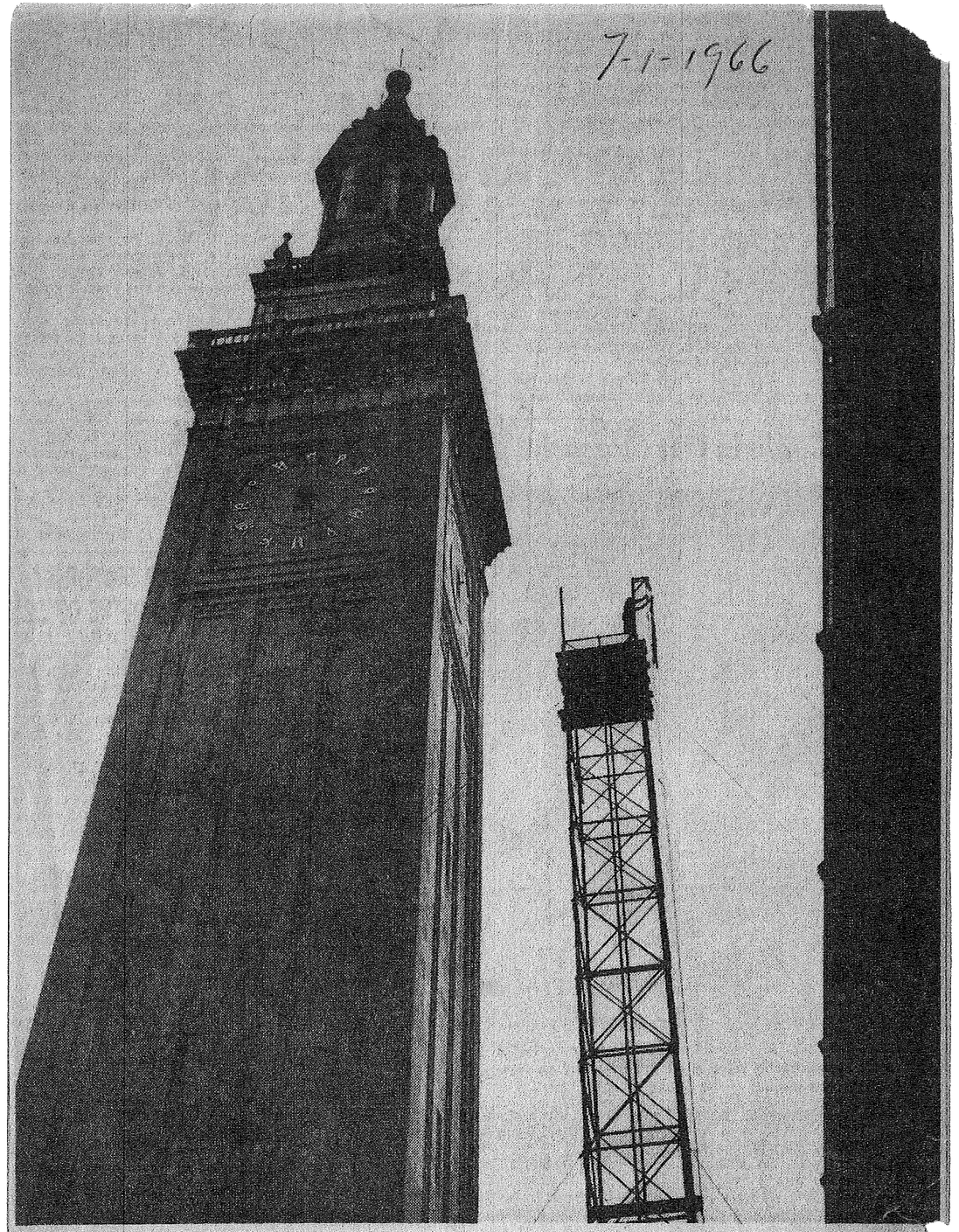
He estimated it would cost about $150,000 to remove the top third of the structure and eliminate the damaged section.

The top third of the tower is terra cotta construction, and the other 200 feet of the Campanile is limestone. Basis of the present trouble is that the terra cotta was eaten away by the elements, while the limestone resisted deterioration.

"Get Work Done"

Councilor Frank H. Freedman said he doesn't know if it would be worthwhile to hire another consultant, based on studies already made which show the need for repair. If the city feels it should retain the Campanile, he said, then the "best thing would be to go ahead and get the work done."

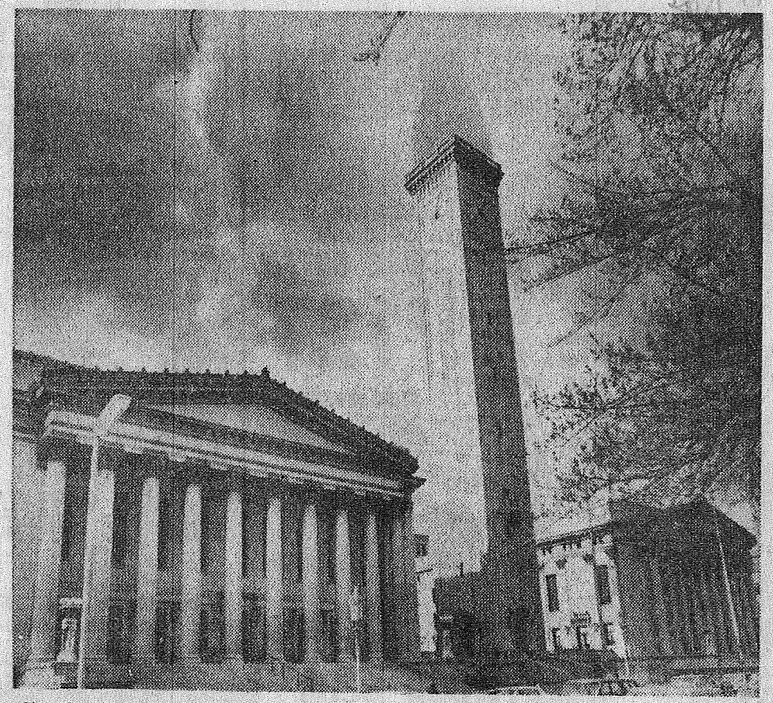
7-1-1966



OUTSTRIPPING TOWER—The Campanile, the tallest tower in the city, will soon be outstripped. Slated to rise about 10 or 15 feet higher than the municipal structure is this hoist tower now being constructed at the rear of the Campanile in the horseshoe parking lot by Belanger Construction Co., which has a $650,000 contract to repair the deteriorating top third of the tower. According to Public Building Supt. H. B. Sornborger, the hoist tower, when completed, will have an elevator within its frame to be used strictly for hoisting materials to the top for the workmen. The workmen will use the elevator inside the Campanile. Photo by Daily News staff photographer Stephen N. Lemanis.

Appl 357

Here's How City Landmark Might Look



City Councilors, reacting to the $650,000 bill for repair of the municipal Campanile, have suggested the upper third be chopped off instead of being replaced. This doctored photo shows what the famous landmark would look like without the upper portion. Repair of the 52-year-old landmark is necessary because of deterioration of stone and structural steel. The financial order for the work was delayed at the last City Council meeting, and final action could come at the next meeting April 18.

Counting the Cost

4-8-1966

Councilors are boggling at the projected cost of repairing the Campanile. And well they might, since the current estimate of $650,000 is a lot of tax money.

However, dollars and cents cannot quite measure the value of this impressive bell tower, which can be seen for miles around and serves to identify the governmental center of the city.

Among other things, the tower, viewed from the approaches to the city, and especially from the south, is like a welcome home. It is also the balancing factor in the City Hall complex—and any structure less lofty simply would not fill the bill.

Councilors do well to worry about expenses and to seek less costly ways of making repairs. In one way or another, however, the tower must be maintained as Springfield's most prominent landmark.

ALL 3 Major Pieces . . Sofa-Bed, Chair AND Rocker, with 3 Colonial Tables and 2 Lovely Lamps . . Living Room and Bedroom for only $127.

$127

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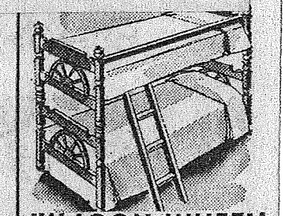

'WAGON WHEEL' BUNK BED OUTFIT

$69

Nutmeg Maple . . Full 39-inch Twin Size. Com-

7-2-1966

Campanile Withstands Bomb But Years Take Their Toll

The current effort to repair the deteriorating municipal Campanile recalls a long-forgotten attempt to wreck the 300-foot tower before it was completed.

At 2 a. m. on April 4, 1911, a bomb exploded in the Campanile's substructure, blasting a hole through a two-foot-thick brick wall.

The explosion shattered windows in nearby police and fire stations and awoke the sleeping city.

If the dynamiting was intended to "lay the skeletal tower across Court St.," as one contemporary news account reported, it failed miserably. The steel framework was not damaged and the construction was not seriously retarded.

The blast, however, had implications reaching far beyond the hole punched in the masonry; the few shattered windows and jarred nerves.

It was part of a conspiracy that had tragic overtones in other parts of the country and which gave the developing labor movement a black eye.

In the overall view, the explosion in the base of the Campanile was of relatively little consequence, except to local residents who were taking pride in the distinctive landmark that was stretching into the sky.

The blast was only one of 69 acts of violence that rocked building constructions in various parts of the country over a five-year period.

It was not nearly as serious as the explosion which took 21 lives at the Los Angeles Times newspaper building on Sept. 30, 1910.

All of these bombings eventually were blamed on the organizers, chief officers and consorts of the International Association of Bridge and Structural Iron Workers—a labor organization headed by the McNamara brothers, James and John.

Their apprehension came about through the hard work of a federal agent, William J. Burns, who had been chief of the U. S. Secret Service. Their trials at Los Angeles in December, 1911, attracted nationwide attention and were attended by controversy and political repercussions.

The iron workers union had been involved in labor disputes over working conditions and salaries of employees at all of the building projects that were bombed.

As the A. E. Stephens Co. began construction of the Campanile here, it too ran headon into labor problems with the iron workers' effort to unionize laborers. That attempt was not successful and construction continued after a short strike by steel erectors.

The steel frame work was erected and masonry sheath in place up to the 185-foot level when the explosion occurred.

Examination afterward indicated that six or eight pounds of dynamite had been used. It was placed in what was called a "curtain wall" of brick on the south side of the campanile, just above ground level.

The explosion tore out a two by three-foot section of brick in the two-foot thick wall. That the tower was not seriously damaged was credited to the fact that the dynamiter had not placed the explosion on any of the beams or girders which carried the weight of the structure.

The contractor declared that much more explosive would have been required to deal the tower severe harm or to bring in toppling.

Great excitement followed the explosion. There were few clues to the identify of the culprit, though some witnesses reported seeing a man run from the scene about the time of the blast.

Mayor E. H. Lathrop offered the city's reward of $500 for apprehension of the bomber and the Stephens company duplicated the offer. George D. Pratt, chairman of the Municipal Group Building Commission, called the bombing a "diabolical act" and Police Chief William J. Quilty and Det. Capt. J. H. Boyle and their men scoured the neighborhood for evidence.

The break, however, came far away, in Chicago, when Burns apprehended Ortie McManigal, an explosives expert and a member of the McNamaras' union.

McManigal confessed to placing many of the bombs that had been set off, including the one in this city, and directed Burns to barns in Indianapolis, Ind., and Tiffin, O., where he had stored explosives.

He also told officials that James McNamara had bombed the Los Angeles Times, killing 21 persons.

With information McManigal provided, federal agents led by Burns raided a union officials' convention at Indianapolis in late April and arrested John McNamara and others.

Without benefit of court procedure, Burns hustled McNamara off to Los Angeles for a grand jury confrontation. This later led to a charge of kidnaping against Burns, though it failed to stick.

McManigal turned state's evidence against the McNamaras and, because of this, he apparently escaped punishment.

During his trial, in which he was represented by famous attorney Clarence Darrow, James McNamara pleaded guilty to murder and confessed the Los Angeles bombing. He was sentenced to life imprisonment in San Quentin. His brother was sentenced to 15 years.

Labor violence attracted the attention of Congress and reforms were instituted.

This city made a half-hearted effort to gain custody of McManigal so he might be prosecuted for the Campanile bombing.

Meanwhile, work on the municipal group continued. The design by Pell & Corbett was hailed worldwide as one of the most beautiful municipal centers in existence.

The buildings were dedicated during a two-day ceremony in December, 1913.

Gerliep, the Human Fly, Starts Job Of Repairing the Campanile Tower

News 8-13-47

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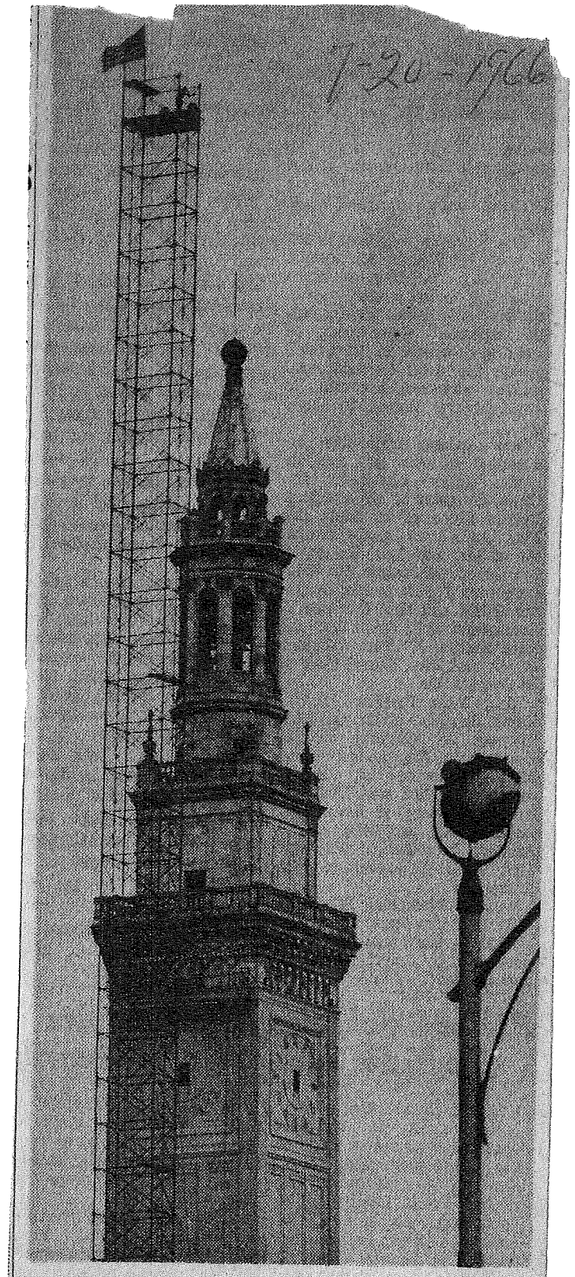
7-20-1966



OLD GLORY ON HIGH — The steel hoist tower to be used for lowering and raising materials in the $650,000 repair job on the Campanile has been completed and now tops the city's skyline, extending about 25 feet above the 300-foot Campanile. An American flag has been attached at the top of the scaffolding. Public Buildings Supt. H. B. Sornborger explained it is traditional to attach a flag on the "high point of steel."

Prepare to Tackle Tower Repair

7-22-1966

Close up view of the Campanile, taken from the roof of a nearby department store, shows the task ahead for workmen now that 300 feet of scaffolding is in place for the materials hoist.

Standard mason's scaffolding will next be placed at intervals from the top down to about 95 feet. This scaffolding will surround the tower and allow working space for men who will chip away at the terra cotta which has rained down on passersby every spring for several years.

After the terra cotta is removed and the bells taken out, men with torches will cut away at the already rusted steel frame.

Workmen will only be able to work here during calm weather, according to Horace B. Sornborger, superintendent of public buildings.

"I have seen it calm at the base and have had steeplejacks come down and say they couldn't work because it was too windy at the top," he said.

For this reason it is estimated the job will take about two years for completion. About 30 workers will be employed when the mason's scaffolding is in place.

Appd 435

News Article

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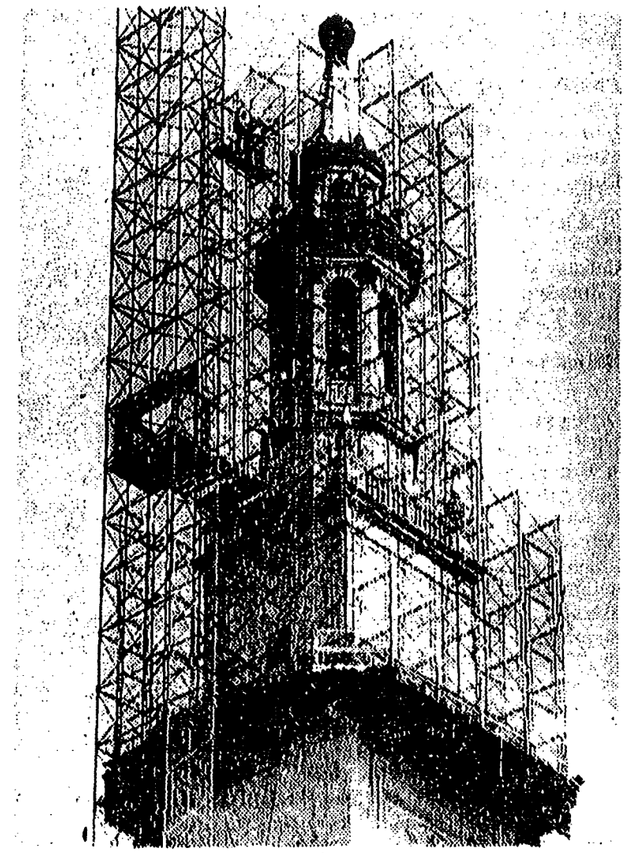
Date: 1966-08-30 Paper: Springfield Union Page: 25

Crew Works Amid Web of Steel



Like spiders in a web, three men, upper left, finish piecing together a steel scaffold around the top of the Campanile as work continues to remove completely and rebuild that upper portion of the structure. Below in the "horseshoe" parking lot, rubble is piling up as workmen knock off the terra cotta decorations on the spire.

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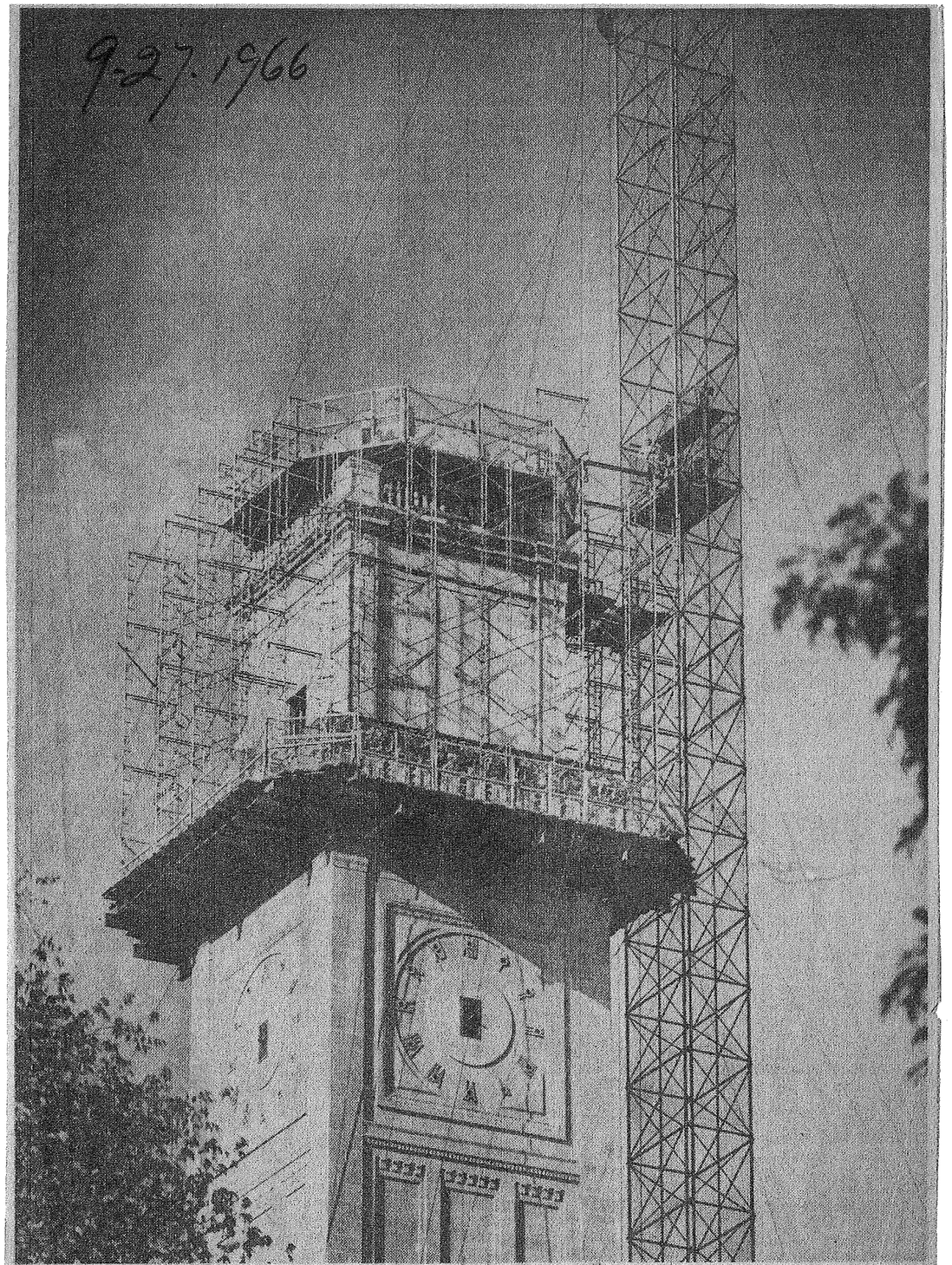
9-27-1966



THE NEW LOOK — Like a giant beset by Lilliputian military forces, the Campanile stands patiently as masons prepare to rebuild after first tearing down the tower pinnacle which had to be removed because of deterioration. The estimated cost of the project is $650,000; estimated time necessary to